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THESIS

NAVY ERP: AN ANALYSIS OF CHANGE MANAGEMENT

by

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September 2013

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13. ABSTRACT (maximum 200 words)

The Department of Defense (DoD) is an immense organization that utilizes thousands of business systems at a cost in the billions of dollars for the operation, maintenance, and modernization of these systems. During the past decade Enterprise Resource Planning (ERP) systems have become a primary focus within the DoD in an effort to minimize the amount of business systems, and bring about process integration across the Services. The DoD has invested billions of dollars toward the development and implementation of numerous ERPs in the past decade. Unfortunately, a few of these ERP implementations have resulted in failure, while a majority of other ERPs are experiencing cost overruns and schedule delays. With existing budget constraints it is imperative that the DoD conducts research to further the development of appropriate ERP implementation approaches. One key attribute of implementing an ERP is change management. Extensive private industry research has been conducted on change management and identifies change management as a critical success factor for any widespread organizational changes. ERPs fit this model and typically involve drastic organizational change. As the DoD seeks to enlarge and transform its enterprise, there is a need for change management research on recent DoD ERP implementations.
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ABSTRACT

The Department of Defense (DoD) is an immense organization that utilizes thousands of business systems at a cost in the billions of dollars for the operation, maintenance, and modernization of these systems. During the past decade Enterprise Resource Planning (ERP) systems have become a primary focus within the DoD in an effort to minimize the amount of business systems, and bring about process integration across the Services. The DoD has invested billions of dollars toward the development and implementation of numerous ERPs in the past decade. Unfortunately, a few of these ERP implementations have resulted in failure, while a majority of other ERPs are experiencing cost overruns and schedule delays. With existing budget constraints it is imperative that the DoD conducts research to further the development of appropriate ERP implementation approaches. One key attribute of implementing an ERP is change management. Extensive private industry research has been conducted on change management and identifies change management as a critical success factor for any widespread organizational changes. ERPs fit this model and typically involve drastic organizational change. As the DoD seeks to enlarge and transform its enterprise, there is a need for change management research on recent DoD ERP implementations.

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LIST OF ACRONYMS AND ABBREVIATIONS

BCA	Business Case Analysis
BIA	Business Impact Analysis
BMMP	Business Management Modernization Program
CBP	Commercial Business Practices
CFO	Chief Financial Officer
CIO	Chief Information Officer
CMO	Chief Management Officer
CRA	Change Readiness Assessment
DBSMC	Defense Systems Management Committee
DoD	Department of Defense
DON	Department of the Navy
DRI	Defense Reform Initiative
EDS	Electronic Data Systems Corporation
ERP	Enterprise Resource Planning
FLC	Fleet Logistics Center
FMMP	Financial Management Modernization Program
GAO	U.S. Government Accountability Office
IBM	International Business Machines Corporation
ICD	Initial Capabilities Document
IOC	Initial Operating Capability
IRB	Investment Review Board
IT	Information Technology
MAIS	Major Automated Information System
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NEMAIS	Navy Enterprise Maintenance Automated Information System
QDR	Quadrennial Defense Review
SAIC	Science Applications International Corporation
SAP	Systems, Applications, Products in Data Processing Company

SECDEF	United States Secretary of Defense
SMART	Supply Maintenance Aviation Re-engineering Team
SPAWAR	Space and Naval Warfare Systems Command
RBA	Revolution in Business Affairs
ROI	Return on Investment
USD/AT&L	Under Secretary of Defense for Acquisition, Technology, and Logistics
VTC	Video Teleconferencing
WCF	Working Capital Fund
Y2K	Year 2000

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I.   INTRODUCTION

The Department of Defense (DoD) is an immense organization that utilizes approximately 2,080 business systems at a cost of nearly $17.4 billion in 2011 for operation, maintenance, and modernization (GAO, 2010). During the past decade Enterprise Resource Planning (ERP) systems have become a primary focus within the DoD in an effort to minimize the amount of business systems, and bring about process integration across the Services. According to the Government Accounting Office (GAO), DoD invested approximately $5.8 billion dollars toward the development and implementation of 10 ERPs as of December 2009 (GAO, 2010). Unfortunately, current ERP programs in progress for the past decade are trending toward higher costs and schedule delays due to a multitude of factors (GAO, 2010). In particular one of the ERPs being implemented, the Navy ERP, recently reviewed by the GAO is behind schedule and running over budget. The Navy ERP was first started in 2003 with an original Final Operational Capability (FOC) of 2011, but as of 2007 rebaselined and revised the FOC to 2013.

Research conducted on DoD ERPs is limited in scope and with very few ERPs fully implemented for any duration of time; it is easy to reason there is a lack of research. Current DoD research has a narrow scope focused on understanding the Return on Investment (ROI) or identifying challenges and problems with recommended solutions. With existing budget constraints, it is imperative that the DoD conducts research to further the development of appropriate ERP implementation approaches. One key attribute of implementing an ERP is change management. Extensive research conducted on change management identified the critical inclusion of change management into any widespread organizational changes. ERPs fit this model and typically involve drastic organizational change. As the DoD seeks to enlarge and transform its enterprise there is a need for change management research on recent DoD ERP implementations with comparison to the private/commercial sector in order to discover relevant factors.

A.   PROBLEM

The DoD is currently in the process of implementing numerous ERPs throughout the Services. Unfortunately a majority of the ERPs are experiencing significant schedule delays and costs overruns from implementation issues. In order to improve the process of ERP implementation, we need to understand how change management application to increase the successfulness of future implementations.

Enterprise Resource Planning (ERP) programs currently implemented across the services continue to fall behind and trend toward higher than expected costs. ERPs are a significant change within an organization, effecting processes and ultimately infringing on the people that keep the organization functioning. The problem is that DoD continues to implement new systems into the DoD Enterprise Architecture without research conducted on all aspects of an ERP implementation in the DoD, specifically; change management.

B.   PURPOSE

The purpose of this qualitative study is to understand change management in DoD ERP implementations by conducting a case study of the Navy ERP in order to discover change management factors. The research conducted in the private/commercial sector identifies change management as an essential factor for successful ERP implementation. Current research on DoD ERPs focuses on ROI and identifying challenges to ERPs, which yields a narrow perspective. Conducting research on change management in DoD ERPs will bring forth discoveries concerning the most important variable of the process, human beings, and further improve future DoD ERP implementations.

C.   RESEARCH QUESTIONS

- Primary:

    1. Is there a significant difference between the change management factors applied to successful commercial sector ERP implementation and DoD ERP implementation?

- Secondary:

2. What change management factors emerge from successful private/commercial sector ERP implementations compared with DoD ERP implementations?

3. What change management model/framework does the DoD utilize in ERP implementation?

4. What change management model or approach best suits the DoD?

D.   BENEFITS OF THE STUDY

In the current DoD environment, there are numerous ERP implementations underway and nearing completion. For the DoD to gain valuable insight from these large, complex undertakings it is imperative that research is conducted on what has occurred in order to be better prepared for future technology implementations. If the current ERP implementations prove successful, it inherently implies that further implementations will occur and in order to be successful all aspects must be examined.

Change management is a critical component of any change initiative and ERPs present a far-reaching and highly risky endeavor that must incorporate the best business practices from both private and public industry. The majority of research conducted on DoD implementations has been focused on ROI, program management and unsuccessful/successful implementation processes, which is limited in scope concerning the effects of change to people also created by a large ERP implementation. This study is meant to conduct research on DoD ERP implementations in order to determine what change management factors help implementations succeed and what approach best fits a military organization such as the DoD, which possesses differences from a private organization. In the end the DoD will be better positioned to carry out successfully future ERP implementations.

This research will further progress the realization that people and the organizational structure, when ignored, can lead to unsuccessful mission accomplishment. This research will highlight the importance of change management and that these factors when taken into consideration require an in-depth understanding of your environment and organization to be successful.

E.   METHODOLOGY

This thesis will utilize literature reviews, historical records, case studies and interviews to collect the necessary information about private sector and Navy ERP implementations. From the collected information this thesis will summarize and identify the most notable change management critical success factors in private ERP implementations. The next step will be to conduct a comparative analysis of the change management factors applied in the private sector against those factors being applied to the Navy ERP implementation. The main focus is to understand the suitability and applicability of the notable success factors in a DoD environment, which is organized and operated in a different manner than private industry.

F.   THESIS ORGANIZATION

Chapter II will present a literature review of change management in order to discover private industry success factors during ERP implementation. The material presented will be a combination of factors from private industry research on ERPs and from actual ERP implementations within private companies. In addition this chapter will define ERP in the current marketplace environment and identify the benefits and resistance to its implementation. The purpose of this chapter is to summarize the most notable success factors, which will enable a comparative analysis in a later, separate chapter.

Chapter III will present an overview of the Navy ERP history starting with the implementation of four pilot ERP programs till the formation of the Navy ERP. From this overview this thesis will then proceed to analyze the implementation of the Navy ERP at Naval Supply Systems Command (NAVSUP), with a specific focus on change management approach and procedures.

Chapter IV will present an analysis of those change management factors determined from the literature review against the factors used by the DoD in the implementation of the Navy ERP. The main focus of the analysis will be to determine whether any major differences can be observed between DoD ERP implementations and those in private industry.

Chapter V will conclude the thesis by identifying those common success factors discovered in the analysis from Chapter IV and then present areas of focus that the DoD can seek improvement from in the development of future ERP implementations. Lastly, additional areas of research will be submitted based upon the findings in the thesis in order to help further the focus on change management.

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II.   LITERATURE REVIEW

Using history itself as an example, change is assured within individuals and organizations and will continue to be a process full of complexity and unforeseen problems. Proverbia website quotes from notable people throughout history reflect a similar understanding of today's dynamic business environment:

- *Change is the law of life. And those who look only to the past or present are certain to miss the future* (John F. Kennedy, 1917–1963).

- *It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change* (Charles Darwin, 1809–1862).

- *Everything changes, nothing remains without change* (Buddha, BC 563–483).

- *Only the wisest and the stupidest of men never change* (Confucius, BC 551–479).

Drawing from the experiences of the past few decades, technological advances have not only increased the occurrences of change, but more importantly the speed at which change is occurring. Change management was developed from this very understanding that if change will occur there must be a process or method to properly manage that change. Unfortunately, in today's environment those who have succeeded at implementing change are fewer than those who have failed. As noted by Epperson (2006), change management produces strong emotions and resistance, which requires a serious and proactive approach to determine the risk, impact, and vulnerability brought to an organization by change. In addition, Hammoud (2008) proposes a business focused definition, which states that change management is the process of deciding which changes to accept based on risk/impact analysis and the determination of gains and losses. Change management can be visualized as a bridge between solutions and results to enable employees to adopt the change and realize the objectives (Hiatt, 2012). Hiatt (2012) also notes that change management is about people and our ability, collectively, to bring about successful organizational change.

Hayes (2010), notes that the rate of change is inconsistent, incremental or transformational, and its course greatly reliant upon the environment and structure of the

organization. Incremental change, according to the punctuated equilibrium paradigm, occurs during times of equilibrium by focusing primarily on the improvement of current working processes through what is considered continuous improvement (Hayes, 2010). Transformational change is change that occurs within an organization during a time of disequilibrium (Hayes, 2010). Transformational change pushes an organization beyond past practices into new processes, which are not about creating efficiencies, but more about conducting operations in a new way (revolutionary). The main idea is that the organization has developed strong interdependencies, through processes that propose the best way of operating, which in turn allows the organization to resist change and remain in a state of equilibrium. In order to bring about change, whether incremental or transformational, there must be a time in which the state of equilibrium is broken, bringing about disequilibrium and the ability to overcome or decrease the resistance to change (Hayes, 2010).

In order to define change management properly a critical first step is to understand how and why change takes place. Change occurs in an organization through factors that are primarily generated from either the organization's external or internal environment. A few examples of external factors are the market situation, technology, government laws and regulations and economics or internal factors such as; corporate strategy, workforce, technology and equipment, and employee attitudes (Passenheim, 2010). In addition, the results of organizational change are tied to the personnel within the organization, which in truth produces the change (Hiatt & Creasey, 2012). Without people, no technology is used nor is any process followed. According to Hiatt and Creasey (2012), five tenets help in understanding the what and why of management; we change for a reason, organizational change requires individual change, organizational outcomes are the collective result of individual change, change management is an enabling framework for managing the people side of change, and we apply change management to realize the benefits and desired outcomes of change. With these tenets in mind the following is an overview of individual change.

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A.   INDIVIDUAL CHANGE

1.   Approaches

With regard to individual change there are four major approaches as presented by Cameron and Green (2009), which provide a necessary perspective from which a change manager may work to gain the proper level of understanding in order to enact successful change management.

The behavioral approach is concerned with the achievement of results from the influence of one individual on another individual through the use of rewards or punishment. This behavioral approach therefore possesses the disadvantage of not focusing on improving internal processes, relationships or goal setting. The key for a change manager using this approach is to ensure that the appropriate reward and punishment strategy is in place to effectively influence individuals during the change process. It is critical here to understand that rewards and punishments are not always financially focused and can entail the use of non-financial methods such as feedback and social reinforcement.

The cognitive approach is focused on how individuals think and react to the situations in which they are involved. In this approach, there is a clear focus on the internal processes within a person's mind and the belief that how we think, produces our emotion. By enacting change to these internal processes, it is believed that an individual can now respond to the situation in a different manner (change).

The psychodynamic approach is focused on the internal environment of an individual going through change and the belief that the individual will go through multiple psychological states. In the Kubler-Ross model (Cameron & Green, 2009), the research was based on terminally ill patients and led to more traumatic responses during change, but research still shows that an individual during an organizational change will still encounter similar stages, but will typically be less disturbing. This approach helps the change manager develop an understanding of the reactions and emotions individuals may exhibit when dealing with major change.

The fourth approach is humanistic psychology, which incorporates the previous three approaches, yet clearly differentiates itself through a focus on individuals using a holistic view to show that individuals exist in a social and cultural context (Cameron & Green, 2009). The focus in a humanistic approach is toward the individual's healthy development and growth combined with their potential.

2.   Models

People are at the center of any change that takes place in an organization and people inherently find change to be a negative process (Cameron & Green, 2009). The instrumental capability a change manager must possess is the ability to identify the distinction between the changing external environment and the concurrent internal change occurring within the people of the organization (Cameron & Green, 2009). Change brings a person through mental phases, which if understood by those enacting change, allows the development of a proper change management plan. Using the Kubler-Ross Model (i.e., Figure 1), based on research of terminally ill patients, it is clear that people undergo differing mental stages as they work to internally cope with whatever significant change is confronting them. This model is by no means the only model to represent human emotions and behaviors, but does provide an understanding of what an individual may experience during a significant change in their personal environment.

Figure 1.   Kubler-Ross Model and Satir Model (From Cameron & Green, 2009)

- Denial–change brings about an emotional detachment that one may feel after learning about a death in the family or that their job may be in jeopardy with the newest Information Technology (IT) system implementation.

- Anger–after the initial shock wears off an individual continues to disagree with the change and has strong emotions that may not always be externally observed. The individual may attack themselves, those around them who may not be experiencing the same emotions or those involved in the change.

- Bargaining–after attacking themselves or others this stage is where a person will seek to retain the status quo or divert the impending change through the process of negotiation with those involved in the change.

- Depression–a person is overwhelmed by the change and their inability to bargain, which allows the development of a sense of pointlessness or willingness to give up.

- Acceptance–from the depths of depression many individuals come to grips with the change by beginning the process of acceptance and become in a sense, prepared.

The Satir model in Figure 1, is based on the research of individuals and families encountering ranges of change, presents a curve that is more aligned with understanding both individual and organizational change. In the beginning there exists a status quo, where the environment is predictable with an individual comforted by the understanding of what and how they must accomplish in their day to day activities. With the introduction of a foreign element (some nature of change), the status quo is broken and a time of chaos begins in which individuals will journey through a range of emotions such as those mentioned in the Kubler-Ross model. From the chaos, a transforming idea occurs at the moment where there is no hope, enabling the individual/organization to come to terms with the reality of the situation in order to move forward (Cameron & Green, 2009). Once this stage of the process is achieved an individual can now begin the necessary process of integration into the new environment, which entails training and restructuring of the currently held operating environment. This process of eventually adopting the new processes into the organization and acceptance of the change creates the development of the new status quo. Combined with the Satir model, the Kubler-Ross model of mental stages helps a change manager begin to see the areas of concern and

where to properly focus valuable resources in order to decrease the change curve and natural resistance behavior people will typically assume when faced with change.

B.   ORGANIZATIONAL CHANGE

With a limited understanding regarding the challenges of individual change it is quite simple to begin to visualize the complexities of individuals working collectively within an organization undergoing change. Organizations thrive based upon the inner workings of its individual people whether formed as teams or division combined with either high or low interdependence. An organization internally possesses interdependencies between individuals, teams and divisions, which lead to the development of cultures. Culture is the shared values, beliefs and habits within an organization that produce behavioral norms (Murthy, 2007, p. 118). It is imperative to understand that developed cultures are not identical across organizations and typically possess sub-cultures, especially in larger organizations. Numerous approaches have been developed over the past decades to manage organizational change, but in order to simplify and bring about a general understanding of change management approaches there is only a need to select a couple notable ones.

1.   Kurt Lewin

As noted by Hayes (2010), Lewin identified a state of no change, which did not imply that everything is stationary, but one involving a state of "stable quasi-stationary equilibrium." This idea is best explained by Figure 2, which it shows that the state of an organization before change is enacted remains in this type of equilibrium due to driving forces (change) and a restrained force (resistance). This depiction can be understood by anyone who has worked in an organization where they have experienced a great idea on how to improve a process, but find themselves incapable of persuading the individuals who are content with the status quo. You can see that the driving forces of change are not enough to overcome the restraining forces and finally resolve back to the stable quasi-stationary equilibrium.

Figure 2.   Lewin's Change Forces (From Hayes, 2010)

As Hayes (2010) notes, Lewin developed a useful three-stage model of unfreezing, movement, and refreezing in which a change manager can begin to visually grasp and plan accordingly for the proper management of any major change. The model presented is based on Lewin's original model, but understand that numerous improvements and alterations have also been developed based on Lewin's original model, which still maintains the simple three stage structure.

Unfreezing signifies that the organization is currently situated in a state where the driving forces of change are approximately equal to the restraining forces which means an organization must be unfrozen by decreasing or increasing one of the forces in order to bring about change. Mentioned earlier, the person with the idea of change will not be able to effectively institute the change if the majority of individuals within the environment resist the change. Creating a vision is a good example of enlightening those who are resisting and works to motivate learning and change (Hayes, 2010).

Movement signifies the process of shifting the equilibrium through the modification of attitudes, beliefs, processes, and system in an attempt to influence behavior (Hayes, 2010). Movement is the change plan being executed in order to shift the forces at play in Figure 2. The further the restraining forces are reduced the higher the increase in driving forces becomes for a change to occur.

Refreezing is the process of reinforcing those new processes and behaviors developed from the movement phase, which can be obtained through feedback mechanisms. This is a critical step in the process where there are still resisting forces at work attempting to stall the change or at achieve a failure to take a firm hold in the

organization. Each stage of the Lewin model carries the same weight and is just as critical to the process as any other stage.

There are additional theories and numerous arguments against the use of Lewin's model within modern organizations, however research conducted by Ford and Greer (2006) tested multiple hypothesis using Lewin's framework and discovered that organizations experiencing change exhibited a progression similar to the three stages of Lewin's model (unfreezing, movement, and refreeze).

2.   John Kotter

In addition to Lewin's model for change, a framework of prominence in the field of organizational change was developed by John Kotter (1995) after he conducted research on change implementations within a 100 different organizations. Through his research Kotter identified an eight-stage process for managing change effectively.

1. Create a sense of urgency–within the organization there must be an urgency to dislodge those following the status quo and to engage in the process of change. As noted by Kotter (1995), over 50% of companies failed in this first step due to their inability to properly estimate the resisting forces as noted by Lewin

2. Forming a powerful guiding coalition–it is vital that this coalition is neither too small nor lacking in leadership. This step according to Kotter (1995) is concerned with achieving mass and executive leadership early on in the change process, but then growing to include numerous other personnel within the organization as change progresses.

3. Creating a vision–the vision for the change must be simple and allow personnel to identify with what is taking place. Companies that ended up failing their change implementations typically produced detailed plans combined with economic evaluations, but no clearly defined vision pointing to where all the change is leading.

4. Communicating the vision–once a vision is created there must be a 100% effort to effectively communicate the vision by incorporating all of the communication tools available. Successful companies typically had senior level management that also set the example by visually exhibiting the new culture articulated by the vision. The step will

work to get the necessary personnel to disagree with the status quo, see the solution to the problem as viable and make sacrifices to see the change through. Transformation is impossible without the commitment of a large group of people who are willing to make sacrifices and help with the change (Kotter, 1995).

5. Empowering others to act on the vision–for this step to occur, large obstacles in whatever form they take (leaders, systems, and policies) must be confronted or removed. Obstacles that are allowed to decrease the momentum of change to a large degree typically lead to a stall change or never achieving the full capabilities as envisioned.

6. Planning for and creating short-term wins–change takes time, especially with regard to an Enterprise Resource Planning (ERP) system and in order to continue the momentum there must be the inclusion of short-term wins to keep personnel motivated engaged and part of the vision. This is an active process and implies that leaders are setting goals and objectives to achieve, which leads to properly rewarding and motivating personnel involved through feedback.

7. Consolidating improvements and producing still more change–this step is required because of numerous companies in change as noted by Kotter (1995) declare victory too soon which allows the change to lose momentum and once again face the resisting forces that never subside. This step focuses on using the short-term wins as evidence to support even larger necessary changes that are not aligned with the change vision.

8. Institutionalizing new approaches–change is complete when the organization begins to utilize the new processes and experiences the acceptance of new behaviors and culture. Numerous errors occur at this step in the implementation by either allowing new leaders to enter into the organization that do not exemplify the new approach or the change is only linked to the change leaders who retires or leaves. It is important that individuals accept he changes and absorb the new culture into their daily operations.

3.   Beckhard and Harris Change Equation

In line with Lewin's theory and a basis for numerous theories regarding change is the change equation, presented by Beckhard and Harris (1977) and further simplified by Dannemiller and Jacobs (1992), as follows:

D (dissatisfaction) x V (vision) x F (first steps) > R (resistance to change).

The basis of the formula is the understanding that resistance to change is a strong force that requires multiple factors multiplied together in order to overcome the resisting forces, which is also a foundational principle in Lewin's theory. D represents the dissatisfaction with the current situation within an organization followed by the developing vision of what can be achieved and completed with the identification of those steps in gaining the vision. If any one of the factors is zero the driving forces of change will not be adequate enough to overcome the resisting forces.

4.   Resistance to Change

While change is an evasive and emotional roller coaster for any organization to implement, the very act of implementing change results in a reactive force termed resistance to change. Resistance to change has been often noted from surveys conducted by Deloitte and Touche, as a reason for change implementation difficulties (Erwin, 2010). As noted by Murthy (2007, p. 121), organizational culture is a significant and powerful force against change and identified technological change, which can threaten the cultural assumptions that promote common understanding.

Research by Erwin (2010) suggests that the definition of resistance to change has evolved throughout the years and reveals that resistance to change spans the cognitive, affective and behavioral dimensions. In order to effectively manage resistance, Erwin's (2010) research shows that numerous studies identified factors that possessed the ability to influence individual attitudes, which are; communication of the change, the level of understanding of the change, consistency of management actions with the goals of the change initiative, and participation in the change process. It is critical to understand why

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people resist change such as three reasons presented by Hoetzel (2005), which points out that people resist due to a lack of skills in order to gain system benefits, lack of understanding with regard to the application of the system combined with business process changes, and system-related changes brings about structural and responsibility changes. Those leading change must understand what lies behind the forces of resistance and properly develop a strategy in order to enable effective resistance management.

C.   ENTERPRISE RESOURCE PLANNING

In today's business environment companies continue to face increasing competition, expanding markets and customer expectations along with rapid changes (Pasaogulu, 2011). Merrell (2012) identified that change is a constant reality for current organizations and in order to survive they must be able to effectively manage the necessary and unforeseen changes. A trend and significant organizational change for the past couple decades within private industry and the DoD is the implementation of technology in the form of information technology software known as an Enterprise Resource Planning (ERP) system.

1.   Definition

An ERP is simply the use of software and databases used in concert to automate and integrate information processing within an organization (Anderson, Banker, Menon & Romero, 2011). The goal of an ERP and its expected benefit is the reduction of redundant business processes throughout the organization into streamlined processes, which yield a decrease in unnecessary, inefficient processes to bring about information transparency through accessible databases. Another definition by Monk and Wagner (2009) that brings further clarity is:

> ERP programs are core software used by companies to coordinate information in every area of the business. ERP programs help to manage company-wide business processes, using a common database and shared management reporting tools. (p. 1)

As noted in Figure 3, ERP vendors possess standardized modules that deploy with industry best practices. Organizations are capable of selecting prepackaged capabilities, which align best with their operations.

Figure 3.   ERP Modules (From Wright, 2013)

2.   ERP Benefits

Organizations implementing ERPs have come to expect benefits such as streamlined business processes, process automation, business visibility, lower cost of software and services, Return on Investment (ROI), and the ability to connect with customers and suppliers (Abardeen Group, 2007). These benefits are also advertised by vendors such as SAP (leading ERP vendor), additional benefits to reduce risk, improve productivity and insight, higher ROI faster, and the improvement of operations and strategy alignment (SAP.com, 2013). This list of expected benefits is in reality a long list of wishful thinking, directly related to the use of the term expected. As noted through a study by Panorama Consulting Services (2011) many ERP deployments fail significantly in their attempt to achieve all of the expected benefit with 60 percent of SAP, Oracle and Microsoft Dynamics implementations achieving less than 60 percent of the benefits (Mishra, 2011).

3. Change in ERP

No matter how simple this technology may appear from concisely stated definitions, it is critical to understand that an ERP is a far reaching system, which typically affects all business units within the organization and can increase resistance to change. Aladwani (2001) notes that an ERP can yield numerous sources and types of resistance, which are characterized by using a framework from Sheth (1981) that identifies perceived risk and habit. Perceived risk deals with a person's perception of the decision to accept the ERP while habit deals with the understanding of an employee's current practices and routine. ERPs in addition to being far-reaching are difficult to implement as identified by numerous surveys such as Robbins-Gioia (2002), which discovered from a survey of 232 respondents covering multiple industries, findings which revealed 51 percent experiencing ERP implementation failures and 46 percent of ERPs implemented are not utilizing the full benefits due to a lack of user understanding according to Robbins-Gioia website.

An ERP focuses on processes within a business and inherently utilizes best practices, yet each and every business has its own individualized processes, which ultimately means people will have to change the way they conduct business. A focal point of the resistance to change develops from this point where ERP best practices conflict with unique organizational business processes. This conflict is argued by Swan et al. (1999) as the root of ERP high failure rates with vendors seeking one method fits all generic solutions for the marketplace and business organization who are working to gain unique business solution. The harder the organization works to customize an ERP to fit their organization the more cost, schedule and resistance will increase due to costly upgrades and changes to software code. This leaves a majority of organizations to accept the best practices of the ERP modules and work to redefine and adapt their business processes. Change management is a critical component of an ERP implementation and helps a company achieve success.

What an ERP implementation boils down to is far-reaching change that must be analyzed and planned for in order to achieve expected benefits. Research conducted by Motwani, Mirchandani, Madan and Gunasekaran (2002) on two companies implementing

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ERPs revealed that careful change management, network relationships and cultural readiness can assist in achieving successful ERP implementation. A literature review conducted by Kronbichler, Ostermann, and Staudinger (2009) revealed change management ranked second under top management support as a critical success factor in ERP implementation and appeared regularly within ERP literature. Resistance to change is one of the obstacles that are faced by ERP implementations that have led to half of ERP projects failing to achieve benefits due a lack of effort in managing change (Jarrar, Al-Mudimigh, & Zairi, 2000). Jarrar et al. (2000) points out that change management is one of four critical success factor categories that must be a part of ERP implementations in order to meet success factors that go beyond technical aspects. Jarrar et al. (2000) terms change management as a soft issue that has typically lacked the required focus needed to obtain success when the measure of success uses a holistic view (product, people, and plant). Additionally, a literature review conducted on ERP implementations by Nah and Delgado (2006) revealed seven main categories; business plan and vision, change management, communication, team composition (skills and compensation), project management, top management support, system analysis (selection and technical implementation).

D. ERP CHANGE MANAGEMENT SUCCESS FACTORS

In order to properly evaluate the Navy ERP, it is necessary to conduct research into what change management factors exists in the private industry that have led to successful ERP implementations. In an attempt to cover all facets of change management this research looked at both change management factors (organizational change context alone) and ERP change management factors to identify a collective set of factors for proper comparison.

Regarding change management factors a Prosci change management benchmarking report (2012) identified correlations with change management effectiveness against meeting project objectives and staying on schedule and budget. Prosci collected data from 650 project leaders and change management practitioners representing organizations from 62 countries to determine six top success factors of

change management; sponsorship, communications, approach, resources and funding, employee management, manager engagement.

Research conducted by Aladwani (2001) focused on change management in ERP implementations and identified change as a common difficulty, which required a responsive strategy to avoid. The suggested framework involved three phases with identified factors within each phase:

- Knowledge formulation phase

    - analysis of users and influential groups to obtain attitudes (beliefs, values, and interests)

- Strategy implementation phase

    - communication to affect attitudes of users

    - teaching

    - influence users through marketing a positive outcome and maintain low adoption costs

    - differentiation to present higher quality of ERP

    - hands-on training

    - endorsement of well-known individuals and opinion leaders

    - timing of implementation

    - top management commitment

- Status evaluation phase

    - monitoring strategy

    - evaluating strategy

    - feedback from users

    - top management takes appropriate action

Another literature review conducted by Jarrar et al. (2000) noted that the critical ERP success factors fall into the following categories; top management commitment, reengineering of existing processes, the IT infrastructure, and deploying change management.

A survey conducted by Deloitte (2005) comprised of 35 people from 29 companies, which were involved in their companies' ERP implementation provided responses that reveal the critical change management success factors. The top factor from

the survey was the involvement and support of project leadership (87%), followed closely by a focus on deployment (83%) and end-user training (70%). Lower percentage factors included end-user communication (53%), end-user involvement (50%), team effectiveness (40%), organizational leadership (40%) and lastly culture (20%).

The IBM's 2008 Making Change Work Study as noted by Jorgensen, Owen, and Neus (2009) highlighted the response of 1,532 practitioners dealing with project change. The key success factors noted by Jorgensen et al. (2009) are top management sponsorship, employee involvement, honest and timely communication, and corporate culture. When change management procedures were formalized and specified by organizations they had a 52% project success rate, compared to 36% for those organizations that improvise based upon the situation (Jorgensen et al., 2009).

In late 2000, Marathon Oil Corporation, headquartered in Houston, Texas began an ERP implementation in order to grasp the opportunity of reaching a higher level rather than attempting to fix any specific organizational issues. In Marathon, the upfront research helped the implementation develop an appropriate strategy to deal with the difficulties of an ERP. Most importantly Marathon made change management an integral discipline and developed a strategy to deal with change management by generating the goal of transferring ownership from the project team to employees who would use the tools (Stapleton & Rezak, 2004). The three fundamental drivers of ownership transfer became knowledge, responsibility and vision transfer. A critical successful factor employed by Marathon was communication. Marathon utilized one-way communication in the form of newsletters, website, and town meetings. Interactive communication involved the use of workshops, issue-tracking meetings, conference calls and collaboration via websites. Lastly, hands-on interaction through subject matter experts, sandbox activities and workshops.

The next successful factor employed by Marathon was the selection of a skilled project management team along with hand-picked, high-caliber transition leaders assigned to take charge of the implementation in their organization. This approach facilitated communication across different groups, identified stumbling blocks and allowed leaders to close gaps in their teams (Stapleton & Rezak, 2004).

Another successful factor was the development of a vision combined with a unique solution involving a discovery map to share the vision of the organization with the employees.

Figure 4.   Marathon Oil Discovery Map (From Stapleton & Rezak, 2004)

Lastly, additional success factors identified from the Marathon implementation were executive support, rewarding individual and team success, organizing around business functions and processes, proper upfront planning, and employee engagement. In the end Marathon implemented a worldwide ERP consisting of eight major enterprise software modules in only 13 months (Stapleton & Rezak, 2004).

In the late 1990s, Rolls-Royce successfully implemented an ERP in order to update existing operational infrastructure and functionally oriented departments (isolated), which consisted of over 1500 systems (mainly legacy) that did not provide accurate, consistent and accessible data (Yusuf, Gunasekaran, & Abthorpe, 2004). The successful change management factors in dealing with cultural problems were training (specialist experts, seminars, and demonstrations), and communication.

From 2005–2009, Avon Cosmetics implemented a successful global ERP system by focusing on change management (Rouncefield, 2011). The success factors were defining a structured approach to manage change, champion of change, workshops, role-

mapping, communication, regional teams with proper skillsets, employee involvement, training, and progress reports post-implementation.

Sumner (1999) reveals the success factors of numerous ERP projects implemented at Monsanto, Anheuser Busch, Sigma Chemical, Boeing, Edward Jones Company, Ralston Purina Company, and Emerson Electric Company. After examining the case study of each company ERP implementation, common success factors were, top management commitment, project leadership, training, limited customization and reengineering business processes, project leader (champion), effective communications, and the use of consultants or business analysts.

A review of private industry ERP implementations has revealed a tremendous amount of perspective on change management and the success factors that can help DoD develop appropriately, effective change strategies.

E.   SUMMARY

It appears that there is a majority of factors that repeat throughout literature or rise to the top of surveys and research as change management factors critical to the success of an ERP implementation. The following are those private industry factors that will yield the most effectiveness analysis when compared to the Navy ERP implementation.

- Top management sponsorship–Leaders must be engaged in ERP implementations by empowering employees, setting corporate culture, allocating resources and supporting the implementation overall (Jorgensen et al., 2009, Kronbichler et al., 2009). Included with supporting the implementation, top management must be equipped with tools to monitor project progress throughout lifecycle of the process (Kronbichler et al., 2009). Within top management support is the identification of a champion to drive consensus, oversee the implementation and maintain the perseverance of the organization (Nah & Delgado, 2006).

- Training and education–Users are those people that create a successful implementation and for that to occur personnel must receive the proper skills necessary to function in the new ERP roles. Training and educating end-users allows for the possible achievement of all ERP benefits and greatly reduces negative consequences associated with under trained users (Jarrar et al., 2000). Resistance to change is a critical factor in ERP implementations, but with training that resistance can be greatly decreased

when users are knowledgeable and trained with the proper skills (Kronbichler et al., 2009).

- Communication–If there is one factor capable of influencing the resistance to change it is communication in all phases of implementation with the goal communicating the change, the level of understanding the change, consistency of management actions with change initiative goal and participation (Erwin & Garmin, 2010). Communication must also be effective at reaching all levels of the organization by communicating expectations, goals, and rationale (Nah & Delgado, 2006).

- Project Management–Effective project management includes defining project responsibility, clearly defining project scope, coordinating internal and external activities amongst the numerous entities involved, ensure the timeliness of meeting milestones and monitoring project progress (Nah & Delgado, 2006).

- User Involvement–Not to be confused with user management, user involvement is the two-way communication between leadership about ideas and issues concerning the implementation. Jorgensen et al. (2009) notes in a study that 72% of organizations believe that employee involvement is vital, which helps empower people and allow the change to happen through them and not too them.

- Sustainment–Sustainment has numerous meanings concerning change management from the maintenance of improvements to the conversion of initial gains into continuous improvement (Hayes, 2010). As noted by Kotter (1995) it is critical to not claim victory too early and lose the momentum of the current implementation. Hayes (2010) promotes a process that focuses on the attitudes and priorities of those effected and build a plan that actively engages them in remaining vigilant.

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III. NAVY ERP

A. BACKGROUND

In the early 1990s, as ERP technology began to emerge throughout businesses in the private sector, the United States government started to perceive the advantages of incorporating this new advancement into government agencies. The first notable action that spurred the government toward the incorporation of ERP technology was the Chief Financial Officers Act (CFO) of 1990. A GAO report (1991, p. 1) stated that *this is the most comprehensive and far-reaching financial management improvement legislation since the Budget, and Accounting Procedures Act of 1950*. The CFO (1990) identified billions of dollars being lost each year due to fraud, waste and abuse, out-of-date management systems, lack of vision and oversight from leadership in the development of modern accounting practices and processes, and an inability of systems to provide complete, consistent, reliable, and timely information. The CFO (1990) recognized the need for government to improve financial accounting, reporting practices and requirements, management systems, and overall leadership and direction. The CFO further established CFOs in all major government agencies (22 agencies total) to conduct oversight of agency financial matters with numerous functions, which ultimately established the necessary leadership structure for future development.

In 1996, the Joint Chiefs of Staff developed a Joint Vision 2010 document with the purpose of developing a conceptual template to enable the Armed Forces to channel innovations and technological opportunities toward a higher level of joint warfighting effectiveness. JV 2010 gave direction to modernize the DoD through the integration of knowledge and capabilities across services by means of current and private industry technological advances.

In 1996, the Clinger-Cohen Act created the position of Chief Information Officer in the DoD, which identified that the CIO is responsible for the management of the DoD's investments in information technology to maintain and facilitate the

implementation of a sound and integrated technology architecture (Clinger-Cohen Act, 1996, public law 104-106 Feb 1996).

In 1997, Secretary of Defense, William S. Cohen released the Defense Reform Initiative (DRI) Report in response to a recent Quadrennial Defense Review (QDR) earlier in the year. The QDR conducted an analysis of the national security threats, risk and opportunities facing the United States out to 2015. From this report and previous government initiatives it became apparent that the DoD needed to transform its strategy and become better prepared for the challenges of a new century involving rapid change and unpredictability. The DRI additionally sought a Revolution in Business Affairs (RBA) in an effort to bring the management techniques and best business practices of private industry leaders. The message below from SECDEF William S. Cohen in the 1997 Quadrennial Defense Review accurately portrays the bottom line of the DRI and represents the motivation for DoD to transform its force through technological means.

> Over the past decade, the American commercial sector has reorganized, restructured, and adopted revolutionary new business practices in order to ensure its competitive edge in the rapidly changing global marketplace. It has worked. Now the Department must adopt and adapt the lessons of the private sector if our Armed Forces are to maintain their competitive edge in the rapidly changing global arena. The Department has made much progress already....However, we need to go much further and deeper, and we need congressional support. (Cohen, 1997, p. 2)

In 1997, the RBA was developed as an alternative to other approaches at reform and originated from the DoD's misallocation of resources, rigid bureaucratic procedures, inflexible business practices and reluctance toward innovation (Ackerman & Kleinman, 1997). The purpose of the RBA was to empower personnel and foster an atmosphere of competition amongst military support activities in order to ultimately create change from the bottom of the organization up (Ackerman & Kleinman, 1997).

It is clear from the legislative and individual Service actions that there was indeed a motivation for change in public business operations, however, these actions did not identify ERP as the solution to the DoD's issues; but they set the conditions and pathway toward private industry technological solutions. At this time in private industries, ERPs were starting to flourish due to the potential problems foreseen with being Year 2000

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(Y2K) compliant (Oxedine & Hoffman, 2002). From this looming crisis, worldwide organization investments for information technology climbed to 64% totaling $27 billion (Oxedine & Hoffman, 2002, Glick 2000). Notable Fortune 500 firms such as Northrop Grumman, IBM, Compaq, and General Electric successfully implemented ERP during this time and began the transition of ERPs from internal isolated processes to one with global and competitive ramifications for other organizations in the market (Oxedine & Hoffman, 2002).

B.   NAVY ERP PILOT PROGRAMS

In 1998, the Navy, in an effort to create a RBA, established an executive committee to look at transforming business affairs and identify opportunities (GAO, 2005). The Commercial Business Practices (CBP) Working Group led by VADM John Lockard, Commander, Naval Air Systems Command (NAVAIR), was established by the committee and consisted of financial representatives from across the Navy, which identified multiple ERP initiatives, at that time, ongoing within the Navy (GAO, 2005, Oxedine & Hoffman, 2002). The goal of the CBP was to look for commercial best business practices instead of commercial financial practices (Oxedine & Hoffman, 2002). The recommendation from the CBP was for the Navy to use ERP as a foundation for change (GAO, 2005). According to GAO (2005) the Navy then proceeded to approved four of the ERP initiatives identified by the CBP to begin development using existing funds and resources within each command. The following were the four initiatives:

- Aviation Supply Chain Management and Maintenance Management (later named (SMART)
- Regional Maintenance (later named NEMAIS)
- Acquisition Program Maintenance (later named SIGMA)
- Financial Management (later named CABRILLO)

The commands implementing the initiatives were NAVAIR, Space and Naval Warfare Systems Command (SPAWAR), Naval Sea Systems Command (NAVSEA), and Naval Supply Systems Command (NAVSUP).

Each pilot Program Manager (PM) was given authority to select integrating contractors and ERP software, which was what the Executive Steering Group noted as the best way to proceed with competition amongst the pilots and observe which one was better (McCarter, 2003).

	NAVSEA Regional Maint.	NAVAIR PM Mgt.	SPAWAR Financial Mgt.	NAVSUP AvSCM/MM
SAP R/3 Version	4.6	4.6	4.6	4.6
Integrator	IBM	KPMG (prime)	PricewaterhouseCoopers	EDS
		SAIC (core)		
		IBM (core)		
Subcontractor	SAP Lockhead Martin DSIC SAIC/AMSEC KPMG	SAP Lockhead Martin Sierra Consulting LLC WDS MATCOM	SAP UII Logicon/INRI CSC	SAP Deloitte
Bolt-Ons	OROS Oracle Documentum Jet Form i2 MQ - Series Plantware Abaco	OROS Oracle Documentum Jet Form ESRI MQ - Series NAVAIR Corp. Sys. Abaco	OROS Prologix Major Procurement (TBD)	Manugistics Xelus

Table 1.   Pilot Program integrator, subcontractor, and bolt on companies (From Huntington, 2000)

1.   NAVAIR (SIGMA)

NAVAIR's mission is to provide full life-cycle support of naval aviation aircraft, weapons and systems, in addition conduct research, design, development and systems engineering; acquisition; test and evaluation; training facilities and equipment; repair and modification; and in-service engineering and logistics support according to the NAVAIR website. NAVAIR maintains personnel at eight major locations across the continental United States with one located overseas.

The SIGMA pilot program implemented at NAVAIR, largest of the four ERP programs, was meant to revolutionize business processes with a future goal of

implementation throughout the Navy (Johnston, 2001). SIGMA was chosen to automate, integrate and standardize human resources, budgeting and planning functions (Johnston, 2001). With over 400 different data systems at NAVAIR handling material ordering and budgets, SIGMA would eliminate legacy systems in the hundreds, and consolidate databases to enable the integration of the organization on one system (Johnston, 2001). SIGMA areas of focus were (Carver & Jackson, 2006):

- Financial management
- Weapons system acquisition
- Asset Tracking / Configuration Management
- Human Resource

The bottom line of SIGMA was the ability to meet the numerous regulations and RBA intentions, which are reflected throughout by Dennis Distler, Enterprise Solutions Program Office, Sigma implementation lead at Patuxent River:

> Implementation of the Sigma Project across NAVAIR will finally enable us to do what all companies must do—(1) enable us to know how we spend our money and know what things really cost; (2) provide the ability to match our workforce to demand and position ourselves for competing in the marketplace for talent in the future; (3) provide end-to-end asset tracking and configuration management capabilities within the Naval Aviation community at large; and (4) provide the system to support decision making at all levels of the organization with speed and accuracy. (Johnston, 2001)

The first wave of SIGMA went live on 1 October 2002, affecting over 7,000 civilians, contractor, and military users at 79 geographic sites, including overseas locations with the expectation of 15,000 future users in a secondary implementation in early 2003 (NAVAIR PA, 2003).

2. NAVSEA (NEMAIS)

NAVSEA, the largest command of the five system commands, is spread throughout the United States at 33 activities in 16 different states and manages a budget of $30 billion, which accounts for over one quarter of the Navy's budget according to the NAVSEA website. The NAVSEA website also mentions that NAVSEA consists of a force totaling 60,000 civilian, military and contract support personnel tasked with the

responsibility of effectively engineering, building, buying and maintaining ships, submarines and current and future operation requirements for the Navy.

The NEMAIS program primarily focused on regional maintenance management (including intermediate level), project systems and workforces management as noted in the following functional areas of focus (Bogdanowicz, 2004):

- Financial management–Budgeting, managerial and financial accounting
- Program management–Project management, planning, program and budgeting
- Human Resources management–Workforce planning & admin, training and development, time and attendance, organization management
- I-Level maintenance–maintenance planning, notification generation, control, requirements, execution, inspection and quality assurance, configuration, and scheduling
- Plant Supply–Requisition processing, inventory management, material requirements planning, hazardous material management, and asset management (plant property)

NEAMIS implementation effort was divided into phases with a projected installation at all Naval Shipyards, Supervisor of Shipbuilding sites, Shore Intermediate Maintenance Activities, Trident Refit Facilities, and all naval ships and submarines (Dyer, 2003). In June 2002, NEAMIS went live at three geographic sites with over 5400 users involved.

3. NAVSUP Supply Maintenance Aviation Re-engineering Team (SMART)

According to the NAVSUP website the primary mission of NAVSUP is *to deliver global logistics capabilities to the Navy and Joint Warfighter,* by managing the Navy's supply system and providing the necessary support and materials to Navy surface ships, submarines, aircraft, and expeditionary forces. NAVSUP is made up more than 25,000 military and civilian personnel in four supporting commands; Weapons Systems Support, Business Systems Center, Navy Exchange Service Command, and Global Logistics Support, which is made up of seven major Fleet Logistics Centers (FLC) located here in the United States and overseas according to the NAVSUP website.

As a joint venture with NAVAIR, SMART ERP is meant to improve parts management, provide asset visibility, increase modeling capability and facilitate command data sharing (Ahem, Olson, & Napoli, 2003). The Navy's implementation of SMART ERP will achieve the goal of replacing outdated management systems (maintenance, supply, and financial) with improved, modern and integrated systems (Ahem et al., 2003).

SMART ERP implementation was divided into a couple phases, starting with the initial phase in the fall of 1999, which consisted of developing concept of operations, areas of opportunities, process complexity analysis, BCA, and software selection (Ahern et al., 2003). On 3 January 2003, SMART ERP went live at four geographic sites and involved over 400 users at locations across the United States.

4. SPAWAR (CABRILLO)

SPAWAR is the Navy's Information Dominance Systems Command responsible for designing, developing and deploying advanced communications and information capabilities for warfighters around the globe according to the SPAWAR website. Specifically, made up of over 9,500 active duty military and civil service professionals around the world, SPAWAR provides the hardware and software required for the Navy to carry out missions and stay at the forefront of research, engineering and acquisition according to the SPAWAR website.

The pilot program to be implemented at SPAWAR was CABRILLO. SPAWAR is a Working Capital Funded (WCF) organization and selected to evaluate CABRILLO as an ERP tool for the following areas (Oxedine & Hoffman, 2002):

- Financial Management–All financial activities to include budgets, funds management, billings, payable, reporting, and employee data.

- Procurement management–All buying activities for maintenance, repair, and overhaul items, from issuing a purchase order, receipt of goods, and processing vendor invoices

- Asset management–Tracking all assets from acquisition to disposal for both real property and improvements.

- Project management–Fully integrated project management systems that tie together project management tools with finance, budgeting, procurement, and asset management data

- Strategic management–Planning and budgeting tool for both annual and long range planning.

In 1999, a BCA completed prior to the implementation of CABRILLO, identified key functional areas that would yield the most cost reductions and improvements in efficiencies and effectiveness (Dyer, 2003). Following the BCA analysis, on 28 June 2001, CABRILLO went live at five geographic sites, which involved over 3500 users and an effort to begin the retirement of over 40 legacy business systems (Bogdanowicz, 2004, Dyer, 2003).

5.   Pilot Program Success

In order to ascertain whether or not the four pilot programs were successful it appears to depend on the level of involvement, perspective and evaluation criteria from which you view the implementations. After reviewing multiple sources it appears that the Navy found the pilot programs very successful and productive, while the GAO (2005) reported them as a waste of money, time and resources.

a.   *GAO*

According to the GAO website, the GAO is an independent, nonpartisan agency that works for Congress to investigate the expenditure of taxpayer dollars by the federal government. In a GAO (2005) report, pilot program issues were noted in three areas of importance; pilot projects lacked coordinated management oversight, pilots projects were developed independently of each other, and pilot programs lacked department wide oversight.

In regard to oversight the GAO (2005) report noted that each pilot ERP initiative was managed and funded separately by each individual command, which brought about an increase in cost and program scope limitations. Additionally, the lack of centralized management oversight and control over pilot programs essentially led to four new, stovepiped programs in the DoD that were incapable of integrated operations

and maintained unnecessary redundant capabilities. Lastly, the lack of oversight led to an inadequate review process typically required for projects with a similar magnitude.

Type of functions to be performed	NEMAIS	Cabrillo	SIGMA	SMART
Materials management				
• Sales and distribution	X	X	X	X
• Procurement	X	X	X	
Financial management				
• Financial accounting	X	X	X	X
• Revenue and cost controlling	X	X	X	X
• Asset accounting	X	X	X	X
• Budgeting and funds management	X	X	X	
Program management				
• Project management	X	X	X	
• Program planning, budgeting, control	X	X	X	
Workforce management				
• Time and attendance	X	X	X	

Source: GAO, based upon information provided by the Navy

Table 2.   Functions Performed by Pilot Programs (From GAO, 2005)

The Navy's decision to allow the pilot programs the choice of independently implementing the pilot programs with separate funding led to issues with coordination and ultimately each organization designing the software to meet their personal business needs (GAO, 2005). Table 3 illustrates the high costs expended separately for each pilot program from initiation through FY 2004. The GAO had previously reported in a 2004 GAO report that allowing the funding and controlling of the program at the component organization level leads to the proliferation of business systems. The Navy did respond to this issue early on, but solutions lacked the necessary authority to appropriately control the development of the programs. Additionally, the GAO (2005) identified that due to the flexibility offered by the SAP software, each command configured the software with configuration points to meet their personal focus, which led to software comprised of over 2.4 million configuration points even though many of the business functions performed by the Navy commands were considered to be the same types.

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ERP pilot	Organization	Area of pilot's focus	Initial start	Costs through FY 2004[a]
CABRILLO	Space and Naval Warfare Systems Command	Financial Management • Navy Working Capital Fund	June 2000	$67.4
SMART	Naval Supply Systems Command	Supply Management • Intermediate-Level Maintenance Management • Interface to Aviation Depots	August 2000	346.4
NEMAIS	Naval Sea Systems Command	Regional Maintenance • Intermediate-Level Maintenance Management • Project Systems • Workforce Management	June 2000	414.6
SIGMA	Naval Air Systems Command	Program Management with linkage among: • Contract Management • Financial Management • Workforce Management	May 2001	215.9
Total				$1,044.3

Source: GAO analysis of Navy data.

Table 3.   Navy ERP Pilot Project Cost (From GAO, 2005)

Concerning a lack of Navy department wide oversight the GAO discovered that the Navy circumvented policy by not appropriately designating the ERP pilot programs as Major Automated Information Systems (MAIS). At the time DoD policy required programs exceeding $32 million in a year or $378 million in total life-cycle costs to be designated as a MAIS, yet due to the term "pilot," the Navy did not designate them as a MAIS, which led to deficiencies in oversight (GAO, 2005). Another area lacking in the pilot program, noted by the Naval Audit Service, was documentation in the form of a mission needs statement, now known as an Initial Capabilities Document (ICD), which was meant to describe the user mission needs in the context of business need to be met (GAO, 2005). Overall due to a lack of designation (MAIS) the CIO was not responsible for oversight and therefore allowed oversight at the organizational level, which led to numerous inefficiencies and issues within the pilot programs (GAO, 2005).

In conclusion, the basis of the GAO analysis is aligned with the previously stated regulations, visions, and policy intentions, which direct the modernization of the Services to transform business process and become capable of producing a financial audit of all the Navy's financial operations. Based on these goals the Navy pilot programs, are a waste of money and failures due to the lack of integration, unnecessary redundant functions and the inability to produce a financial audit (GAO, 2005).

b. The Department of the Navy (DON)

The Navy on the other hand determined the pilot programs as successful and if based on the definition of pilot, according to Dictionary.com website, which is *serving as an experimental or trial undertaken prior to full-scale operation or use*, it implies that the intent was to discover what the Navy could accomplish. Bogdanowicz (2004) notes that the pilots proved ERP can be used to:

- Operate and manage major acquisition commands and subordinate commands

- Integrate maintenance and supply, provide resource visibility, and optimize supply chain management

- Validate CFO compliance by reducing legacy IT, database systems, and data quality / timeliness benefits

- Prove COTS implementation in the DoD environment

In a CHIP (2006) interview with Navy ERP Program Manager Ron Rosenthal, he noted that the requirements for the Navy ERP were greatly helped by the pilot programs and stated that the pilot programs as *tremendous benefit of understanding the capabilities we wanted to bring into the Navy that could be enabled by an ERP*. To define success the Navy primarily focused on the new and improved business processes brought about by the pilot programs against the lack of integrated business processes performed by exclusive command legacy systems in the past. With the pilot ERP program implementations, ERP quickly became a solution for the Navy's way ahead.

In response to the GAO (2005) report the Under Secretary of Defense for Acquisition, Technology and Logistics (USD/AT&L) took strong exception to the GAO conclusion that the pilot programs were failures. The response went on further to identify performances by the pilot programs such as (GAO, 2005):

- SIGMA with over 15,000 user, processes 4,700 funding documents and 139 contract actions each week as the system of record for NAVAIR and received the 2005 America's SAP Users' Group (ASUG) Impact Award for business results (first time given to a government agency).

- NEMAIS with over 11,000 personnel has developed standardized business processes for the analyses and correction of issues. NEMAIS has become the foundation for the Navy's maintenance

requirements by allowing improved precision and accuracy in repairs.

- CABRILLO serves over 3700 personnel and manages a financial budget over $1.4 billion.

- SMART ERP, retired by this time, was noted as providing the foundation for supply chain management and produced valuable insight for the construction of a blueprint for the converged ERP program.

- In addition to the programs, it was noted the investment numbers were incorrectly portrayed with only 35% being pilot development cost while 55% was for operating costs and the remaining 10% for converged Navy ERP solution, which would have occurred even if the pilots did not exists, because of legacy systems.

In addition to the response from USD/AT&L, Figure 5 shows the continuous identification of pilot program success throughout the Navy and a strategic position to ensure the continued motivation behind ERP implementations.

As pointed out with the GAO, the perspective on grading metrics has led to differences in opinion as noted by the pilot programs goals in a brief by Captain Bogdanowicz, USN (2004):

- Standardize DON processes

- Provide an Integrated Enterprise solution that seamlessly supports end-to-end capability

- Demonstrate ability to provide accurate, consistent, timely financial information from a single source

- Manage and track cost drivers

Navy Enterprise Resource Planning

Integrating successes of four pilot ERP efforts to reinvent and standardize business processes across the enterprise.

Financial Management (Cabrillo)
-50% reduction in annual cost of Business Systems support
-Cut simplified acquisition requisition-to-order process time from 44 days to 44 minutes for e-Catalog procurement
- Retired 59 Of 72 legacy systems

Aviation Supply (SMART)
-1M+ inventory transactions with less than 0.5% error rate
-Reduced warehouse refusal rate from 3.5% to 0.5%
- Over $1.4M saved in replenishment cost for the ICP in 1st Qtr FY04.

Program Management (Sigma)
-66% improvement in financial statement processing time
-Engineering Change Proposal (ECP) approval time decreased from 87-25 days
- Retired 59 Of 72 legacy systems

Regional Maintenance (NEMAIS)
-Elimination of job rejection notification delay from 20 days to immediate
-Reduced total repair time by 16% -- from 96 to 81 days
- Material inventory provided a one time saving of $2.4M

-**Reliable and timely financial and management information**
-**End-to-end product management and improved interoperability**

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Figure 5.   Pilot ERP Successes (From Veit, 2008)

In the end, whether the GAO or DON concurred on the success of the pilot programs is irrelevant as the pilot programs provided clear evidence that they were not the integrated solution that the DON desired. This desire eventually developed into action, which resulted in the creation of the Navy ERP.

C.   NAVY ERP DEVELOPMENT

1.   Pilot Convergence

Prior to the implementation of the pilot programs there was a realization by the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RDA)) for the requirement of an integrated solution, which directed the convergence of the pilot programs in August 2002, and led to the establishment of the Navy ERP Convergence Team (NECT) in September 2002 with the following goals (Carver & Jackson, 2006):

- Develop a convergence plan for the Navy.

- Identify and document common business processes and unique business processes.

- Identify and document those areas where statute or regulation precludes common process.

- Coordinate Navy ERP architecture with other Navy and Departmental initiatives.

- Develop a Navy ERP acquisition strategy.

- Maximize reuse and integration of existing Navy-related ERP documentation and resources

The Navy ERP began the acquisition development cycle in 2004 and reached Milestone A/B in October of FY 2004. Upon reaching Milestone C in October FY 2007, the Navy ERP implementation 1.1 went live at NAVAIR for testing and achieved Initial Operating Capability (IOC) upon reaching successful sustainment in May FY 2008 (Dalrymple & Kreminski, 2013).

D.   NAVSUP

In an effort to minimize the amount of information and narrow the focus this thesis focused on the single implementation effort at NAVSUP for Navy ERP release 1.0. Release 1.0 while not the most complex implementation or furthest reaching was still the initial implementation at NAVSUP and presented the clearest opportunity for the collection of executed change management planning documents and developed strategies early on in Navy ERP.

1.   Navy ERP Release 1.0

NAVSUP 1.0 implementation was made up of financial management, acquisition and program management, and workforce management as depicted in Figure 6. The 1.0 release was intended to bring NAVSUP online with NAVAIR in the effort to modernize Navy business operations and obtain the financial auditability directed by the RBA and internal Navy strategic planning documents. Navy ERP 1.0 is considered the core foundation of the Navy ERP at NAVSUP, with the ability to allow the distribution of cost allocation for products and service toward execution accountability (Heinrich,

2011). The Navy ERP 1.0 database will achieve the following benefits by reducing (Heinrich, 2011):

- Late vendor payments
- Interest payments
- Delinquent card accounts
- Labor dollars unallocated
- Unmatched disbursements

Figure 6.　Navy ERP 1.0 and 1.1 Release Overview (From Wright, 2013)

NAVSUP began initial enterprise level training sessions in February 2007 until a go-live date of 1 October 2008 at which point Navy ERP 1.0 commenced the conversion of the current financial system of record. As release 1.0 entered the sustainment phase the NAVSUP team turned their attention to release 1.1 with an expected go-live date of March 2010.

2.　Leadership

NAVSUP senior leadership is an echelon level II command in charge of echelon level III and IV commands throughout the United States and at overseas locations. NAVSUP is commanded by a Rear Admiral with echelon level III and IV commands led by additional Rear Admirals and Captains in the Navy. At the time that NAVSUP was

implementing Navy ERP 1.0 the leadership commitment for this implementation far surpassed echelon level II by reaching all the way to Congress and the President of the United States. The direction provided by Congress was in the CFO Act of 1990 and additional legislative initiatives such as the National Defense Authorization Acts along with pressure from the GAO, which increased the pressure on the DoD to transform its business operations in the form of clean financial audits and modernization of its technology infrastructure (Gansler & Lucyshyn, 2009). The pressure from the highest branches of government led the DoD to create numerous programs and entities such as (Gansler & Lucyshyn, 2009, Carver & Jackson, 2006):

- 2001, Financial Management Modernization Program (FMMP) in 2001–purpose was to produce reliable, accurate and timely financial information in the form of an audit by FY 2007. Later in 2003 the mission was expanded and renamed the Business Management Modernization (BMMP)

- 2005, Defense Business Systems Management Committee (DBSMC) and the Investment Review Board (IRB)–DBSMC set business transformation priorities and provide recommendations on policies and procedures. IRB assess investments and their impact on end-to-end transformation.

- 2005, Business Enterprise Architecture–development of a DoD architecture as the blueprint for transformation in the DoD.

- 2005, Enterprise Transition Plan–annually published roadmap for the modernization of DoD business systems.

- 2005, Business Transformation Agency–provided a single point accountability of business transformation efforts.

- 2008, Chief Management Officer (CMO)–serve as vice-chair of the DBSMC and responsible for the strategic management in DoD.

It is apparent from the multitude of initiatives in the DoD and support from Congress that those in command within the Services were also feeling the pressure and those against the transformation were few and most likely weeded out by the time NAVSUP began implementation in 2007 timeframe.

NAVSUP's leadership displayed commitment to the Navy ERP implementation through the use of personal involvement and messaging. Commanders participated in executive level Video Teleconferencing (VTC) with subordinate level commanders, executive change leader workshops, and proceeded to use messaging in the form of

electronic messages from both the NAVSUP commander and Vice Commander (NAVSUP ERP Team, 2008b). Senior leadership was also involved in electronic weekly updates and present on the NAVSUP ERP Extranet website by providing guidance, motivation and direction to subordinate commands. The following quote from NAVSUP Commander, Rear Admiral Thompson in 2007 illustrates senior leadership commitment in helping the implementation process.

> As the person ultimately responsible for the Navy's supply system, I can tell you it is very, very important to me [Navy ERP]…this is a critical change and I appreciate that you have many interests and questions…there are three key points…First, we need a system that can take us into the future. Second, we will help you prepare and train for the new system. Third, the journey will be worth the effort… new system will have significant benefits…we need a system that can take us into the future…we will help you prepare and train for the new system…the change to a completely new system will be a large one and will require a lot of effort and openness to change...the Navy ERP program and NAVSUP enterprise leadership are committed to making this project a success and with your help, I'm sure we will succeed. (Thompson, 2007)

Additionally, NAVSUP senior leadership was involved in the development and execution of the change management strategy as noted by the direction for the change management team to conduct a Business Impact Analysis (BIA) (NAVSUP ERP Team, personal communications, 16 August 2013). NAVSUP leaders also conducted conferences to enable the discussion of critical topics in supporting the NAVSUP Commander's Guidance with Navy ERP being one of those topics, which covered required changes, lessons learned from other echelon II commands, change management techniques and procedures (Derk, 2008a).

3. Organizational Structure

NAVSUP's organizational structure was organized to reflect Navy ERP Program Management (PM) Teams to assist with direct support from the Navy ERP PM Teams and allow coordination between the NAVSUP Team Leads and Navy ERP Team Leads, which were responsible for NAVSUP requirements (NAVSUP ERP Team, 2008b). Figure 6 and Figure 7 depict how NAVSUP was organized in preparation for Navy ERP 1.0.

Implementation Leads

Micheline Lopez-Estrada   *Keith Wright*

Data Conversion and Cutover

Deployment and On-Site Support

Functional Leadership

Data Conversion
Ann Barnhart
Theresa Reed

Transition/Catch-up
J. Antous
Brad Zwirschitz

Navy ERP War Room
J. Antous

User Management
Dennis Helie
Joan Hays

Deployment Leads
P. Nichols
E. Burt-Hedrick

Training Delivery
K. Regensberger.
B. Hayward

QCM
A.Evans
B.Hayward

OSS Coordinator
J. Meyer

Mechanicsburg
S. Reisinger
F.Burt Hedrick

San Diego
S. Benvenuto
Dick Wood

Norfolk
J. Aldridge
Sandy Harris

Puget Sound
L. Stanger
Richard Przybylek

Pearl Harbor
K. James
Kelly Endo

Jacksonville
M. Blair
John Harmon

Yokosuka
W.Green
Mike Murphy

Sigonella
F. Heisner
Rick Sucheck

Philadelphia
J. Matushoneck
Terry Joshua

FI/FM
Maya Peters
Kris Youngblood
CO
Phil Lindogan
AM
Ken Honer
SD
Tom Reddy
MM
Steve Long
PS
David Hellen
WFM
Bob Decent

Mark Johnson
John Boswell
Nan Cullison
Chuck Shuster
Sandy Johnson
Jim McCormick
Wes Dawson
Jerry O'Sullivan
Barb Houdershell

Navy ERP – black
NAVSUP - blue

Figure 7.   NAVSUP Navy ERP PM Linkage (From NAVSUP ERP Team, 2008b)

Release 1.0 Coordinator
Keith Wright

Activity Leads
Joe Catlett
Mary Connor
Harry Ornelas
Michelle Meckley
Lambros Tzerefos

Deputy 1.0 Coordinator
JoAnn McPherson

Functional Leads
Dorsey/McCormack/ O'Sullivan/ Houdershell

Technical
Theresa Reed

System Engineering
JoAnn McPherson

Test
Mary Graci

Deployment
Emily Burt-Hedrick

Information Assurance
Linda Centofanti

Program Control
Robin Johnson

Business Office Operations
Tom Heasley

Cutover
Brad Zwirschitz

User Management
Joan Hays

Change Management
Bob Hayward

Communications
Patricia Patterson

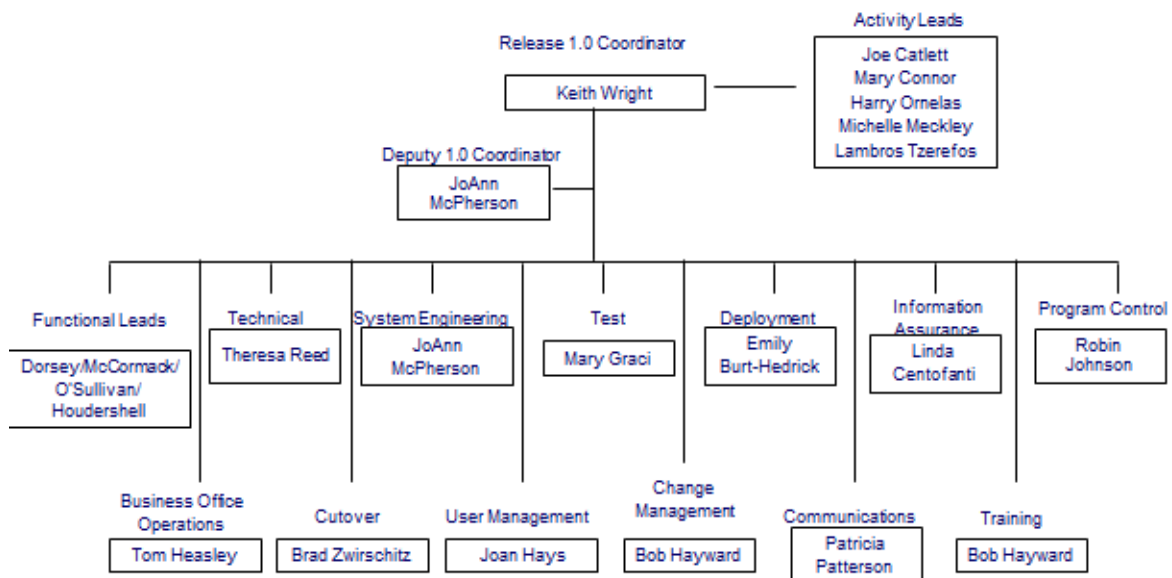Training
Bob Hayward

Figure 8.   NAVSUP 1.0 Team Lead Structure (From NAVSUP ERP Team, 2008b)

4. Organizational Change Management Strategy

Figure 9 is the graphical overview of NAVSUP's strategy for the integration of higher level analysis and team plans into one change management site implementation plan.

Figure 9.   NAVSUP Change Management Information Flow (From NAVSUP ERP Team, 2008b)

The change management strategy used by NAVSUP is detailed by the following steps (NAVSUP ERP Team, 2008a):

- Assess & Plan–Key activities in this step are to identify and analyze gaps, assess the key organizational and people-related risks and recommend mitigation options for risk. Deliverable in this step is the development of a BIA.

- Align and mobilize leaders–Key activities in this step were to create a guiding coalition of leaders with a common vision, build foundational agreements critical to program success and assist leaders in knowing how they can support the program. Deliverables in this step were the vision and compelling reason for change, leadership action plans and Change Readiness Assessment (CRA) recommendations.

- Engage and communicate with stakeholders–Key activities in this step are to partner with local leads and site leaders to leverage the BIA toward

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robust site implementation plans, define clear measures of success to build confidence, and optimize resource capacity with NAVSUP teams. Deliverables are a communication strategy and plan combine with meetings dealing with status/issue resolution, awareness events/information exchanges, go-live prep, and straw model integrated site implementation plan.

- Prepare and equip teams–Key activities in this step were to identify local impacts to roles, determine organizational changes along with design for new environment, match employees, develop local transition plans and augment training as necessary. Deliverables were a workforce transition strategy and plan, job design modifications, and workforce assessment and selection

- Address organizational implications–Key activities in this step were to express unit roles and responsibilities, define accountabilities, interfaces and interdependencies if appropriate prior to go-live, and assist site leaders in defining role clarifications and orchestration of staffing. Deliverable were a refined workforce transition plans.

- The CRA and BIA are intended to be leveraged throughout the lifecycle of the process.

5. Communications

NAVSUP developed a robust communication strategy with the use of numerous tools and methods to enable engagement with Navy ERP users and NAVSUP personnel. The communication process for Navy ERP 1.0 contained the following (NAVSUP ERP Team, 2008b & NAVSUP ERP Team, personal communication, 16 August 2013):

- Enterprise communication and change management team cascading communications methodology.

  - Weekly conference calls

  - Periodic enterprise communications team offsites for strategy development and additional tasks

  - Communications tool kit / communications playbook

  - Road shows and information exchanges

  - Orientation packages

  - Executive level, mid-level manager and end user briefs

  - Videos, Blogs, podcasts, and live chats

- Formal meetings–developed with a focus on efforts, issues, and resolutions concerning the Navy ERP

- Move from general awareness approach to a practical approach
- Use a pull versus push method combined with libraries and data repositories and extranet site.
- Weekly update newsletter–contained supporting comments from NAVSUP leadership along with currently relevant Navy ERP 1.0 upcoming events or general information
- Calendar of team events–developed for general understanding amongst the Navy ERP teams of upcoming events based on identified functional categories:
  - Change management, deployment, finance, functional/data, project systems, training, user management, work force management.
- Communication calendar–contained NAVSUP enterprise wide activities along with highlighted field activity event

Within the communications process there were numerous tools of communication such as VTC and Defense Connect Online (DCO) sessions, press releases via the NAVSUP Public Affairs Office (PAO), and celebration events for meeting objectives (NAVSUP ERP Team, 2008b).

6. Training

NAVSUP's training strategy was implemented early in 2007 and continued to the go-live date (October, FY 2008) and into sustainment post Navy ERP 1.0 implementation. The tools used by NAVSUP were numerous and expansive with a focus on the enterprise level all the way down to the user. Some of the training tools in an effort to communicate Navy ERP to NAVSUP, user roles, enterprise end-to-end processes and business transitions were:

- Workshops
- Conferences
- Summits
- Training events
- Live and virtual town halls
- Instructor led and web-based training, and knowledge events

7.   Role Mapping

In addition to training events the NAVSUP Navy ERP team conducted a user management method called role mapping. Role mapping involves the mapping of Navy ERP roles to the NAVSUP end-users based upon the assigned tasking of each end-user, which serves as a critical activity in the development of training requirements, end-user training schedules and proper account configuration and change management efforts (Navy ERP Program Office, 2010). It is emphasized that role mapping must be performed accurately along with robust role addition / change requests prior to the go-live date to avoid the negative effects of an end-user assigned to the wrong roles at go-live and becoming frustrated (Navy ERP Program Office, 2010). The NAVSUP ERP team conducted role mapping events up till the go-live date in order to properly train end-users for their transition to Navy ERP roles.

8.   Business Impact Analysis

In preparation for the upcoming Navy ERP 1.0 implementation, the NAVSUP change management team conducted a BIA in order to assess the impact of the implementation to the business, enable the ability to conduct robust planning, and provide critical input into the Organizational Change Management (OCM) Strategy (NAVSUP ERP Team, 2008a). The BIA fits into the OCM strategy as an effective tool in developing a plan of action that determines the necessary steps to be taken in order to adjust the new process. Tools used in the BIA for OCM planning include: functional workshops, process artifact review, use of NAVSUP ERP Subject Matter Experts (SMEs) to validate BIA findings, and the BIA document itself. The BIA produced eight overall process impact themes, which were as follows (NAVSUP ERP Team, 2008a):

- Culture shift from organization centric to project centric
- Timeliness and accuracy of time and labor timesheet entry will impact the ERP data reliability
- Electronic workflow is integral to ERP, yet the functional teams have limited exposure and were incapable of properly assessing or planning for its impact
- Due to ERP changes there is a requirement for the development, communication, and training of new process/procedure guidance

- Centralized management of Master Data and Relationships will require redefinition and communication of job responsibilities.

- Increased transparency and visibility of project related data may require increased management attention.

- ERP is code-centric. Incorrect selection or entry of codes when processing transactions could compromise data integrity.

- Some ERP processes will require duplicate data entry (SAP and Official System of Record) resulting in potential increased workload and reconciliation efforts.

The BIA identified four dimensions of change to hold against impacts by process; increasing organizational scope, increasing innovation and uncertainty, increasing resistance, and increasing cultural change (NAVSUP ERP Team, 2008a). Figure 6 shows the priority impacts with a rating of medium or high totaled by process and dimension.

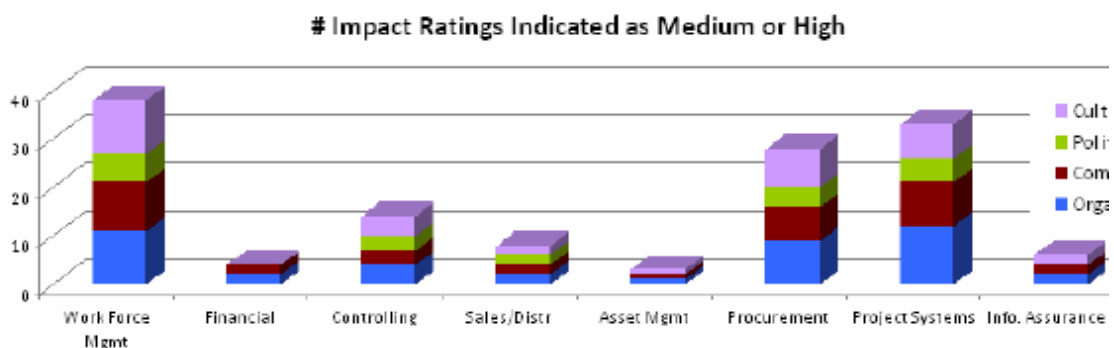| Process	Number of Ratings indicated as Medium or High				Total Ratings with "High or Medium" Rating	# Possible Ratings for Total Process	% of Process Impacts that were rated as "High or Medium" in Level of Impact
	Organizational Scope	Complexity	Political Resistance	Cultural Challenge			
Work Force Mgmt	11	10	6	11	38	44	86%
Financial	2	2	0	0	4	8	50%
Controlling	4	3	3	4	14	16	88%
Sales/Distr	2	2	2	2	8	8	100%
Asset Mgmt	1	1	0	1	3	4	75%
Procurement	9	7	4	8	28	36	78%
Project Systems	12	9	5	7	33	44	75%
Info. Assurance	2	2	0	2	6	8	75%
Total					134	168	53%

Figure 10.   Overview of Process Impacts Across Four Dimension (From NAVSUP ERP Team, 2008a)

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From the BIA findings, NAVSUP was able to develop for each priority impact detailed mitigation options, which identified the impacted groups in the organization, estimated level of effort to accomplish the identified options, and business impact against the four dimensions. The resulting product was then used by NAVSUP to further develop planned activities (i.e., Figure 7) for BIA mitigations approach to be briefed and incorporated prior to the go-live date of 1 October, 2008
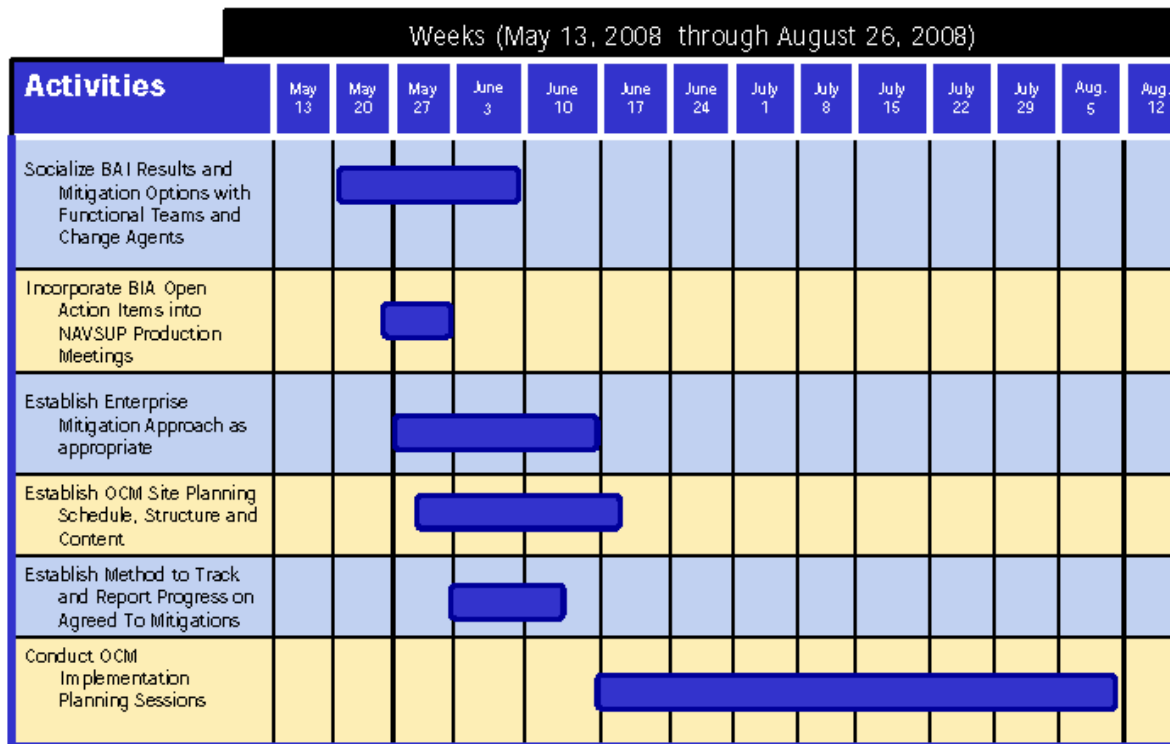

Figure 11.   NAVSUP BIA Timeline Discussion (From NAVSUP ERP Team, 2008a)

9.   Sustainment

Helpdesk Expert Automation Tool (HEAT) tickets were used during the sustainment portion of release 1.0 offering end-users the ability to post issues and receive support as indicated in Figure 10.
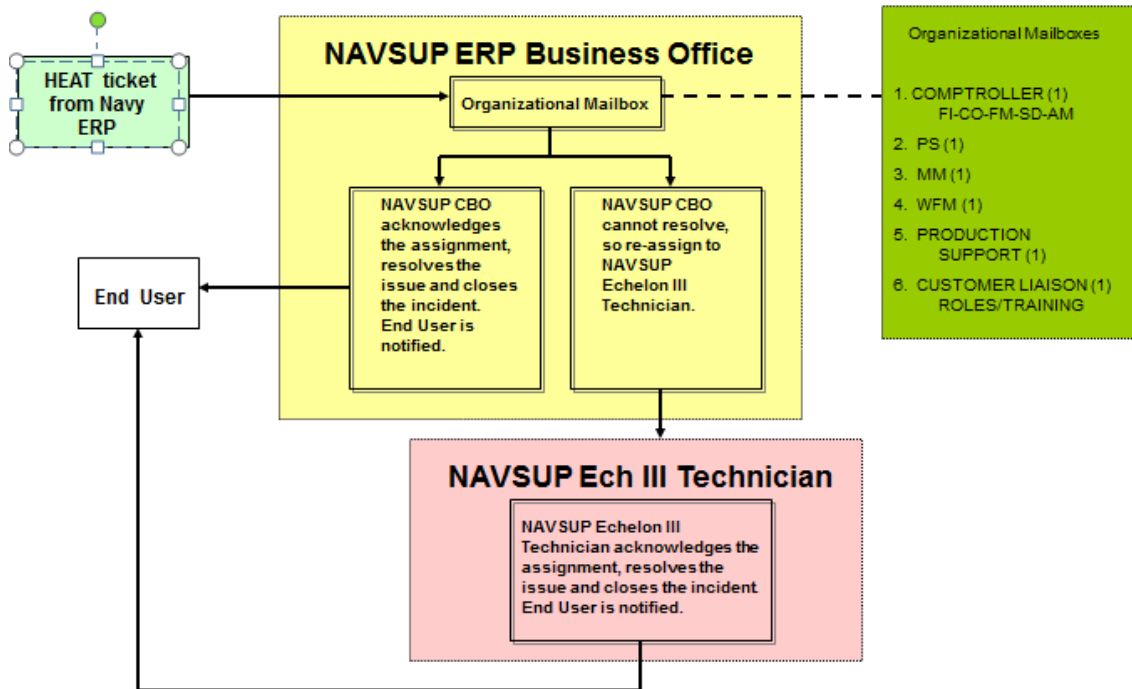
Figure 12.   HEAT Ticket Lifecycle (From NAVSUP ERP Team, 2008b)

According to the NAVSUP ERP website, sustainment training was developed to provide the necessary ongoing training and learning support to the current and future end-users in preparation for ongoing Navy ERP implementations, which will become the foundation for post go-live. The following are a list of the included release 1.0 training according to the NAVSUP ERP website:

- Instructor led training
- Web based training
- Curriculum updates
- Knowledge transfer events (new processes, etc.)
- Training effectiveness analysis

E.   SUMMARY

NAVSUP ERP release 1.0 was celebrated with cake cutting events at various commands after go-live on 1 October 2008. The results were 25 days of transition, release 1.0 trained and deployed to 6,222 users across NAVSUP commands, 8,427 roles assigned, 338,023 master data objects converted and 99.78% data load success rate (Veit,

2009). Even if you consider the release of 1.0 a success there is always room for lessons learned when dealing with an EPR implementation as far-reaching as this one. Lessons learned in regard to training deal with providing more simulations and exercises for transactions, which reflect real actions taken to accomplish the transaction, finalizing curriculum prior to train the trainer sessions, better process for providing answers to site trainers and students and proper planning prior to sustainment by having discussions with management and trainers (Campbell, 2009). While this is not a complete list of lessons learned the NAVSUP ERP team implementing Navy ERP release 1.0 began an immediate transition of focus from 1.0 to Navy ERP release 1.1

IV. ANALYSIS

A. INTRODUCTION

This chapter will provide a comparative analysis of change management factors applied by NAVSUP in the implementation of the NAVY ERP release 1.0 with private industry critical success factors and ERP implementations. As previously discussed in Chapter II the notable change management success factors in private industry ERP implementations were:

- Top management sponsorship
- User management / training
- Communication
- Project Management
- User Involvement
- Sustainment

The focus and scope of this analysis is based on the collection of information concerning the NAVSUP Navy ERP release 1.0 implementation within Chapter III and is not intended to represent all available information regarding the Navy ERP implementation. The information gathered in Chapter III targeted the change management aspects of the implementation at NAVSUP.

Other factors are outside the scope of this analysis is the differences in organization, operations and culture makeup regarding NAVSUP command compared to a private organization.

B. TOP MANAGEMENT SPONSORSHIP

This factor can be considered as one of the major contributing factors in achieving successful change management in an ERP implementation. Top management support is critical to the success of numerous other factors and without it there can develop a tremendous amount of resistance if employees see that the leadership of an organization is not involved. In the Navy, the organization structure and hierarchical structure leads to a typical top-down approach, when change is implemented. A leadership principle in the

military that helps clarify the point is set the example, which communicates that what example a leader sets is the example that will be followed by his or her subordinates. Kotter's (1995) first four steps identify the importance of leadership involvement by their need to form a strong coalition, develop a vision, communicate it and set the example. Successful top management support is exhibited as a constant factor throughout the change process and ready to become involved as needed. Hershey's failure at implementing an ERP in the late 1990s also shed light on the need for senior management to possess the ability to monitor progress through proper feedback channels and develop a proper understanding of the project scope (Perepu, 2008).

At NAVSUP the top management sponsorship demonstrated their commitment in the form of messaging and personal communication with subordinate command leadership. Leadership appears to have been involved in different areas of the ERP implementation as mentioned earlier where senior leadership directed the implementation of the BIA. The BIA is an instrumental tool in the formation of planning and strategy documents, which were integrated and presented as a single, unified plan to implementation sites throughout NAVSUP. Identifying change impacts, mitigation requirements and communicating them to users is instrumental in reducing the restraining forces. Another example of senior leadership involvement was conferences such as the one held in July of 2008 to focus on the October 2008 implementation of Navy ERP. NAVSUP Commander Rear Admiral Alan S. Thompson was quoted saying *we need to continue our momentum and stay engaged as we move forward with our implementation of ERP 1.1* (Derk, 2008b).

Private industry research and literature reviews reveals along with the top management factor the terms; project champion and strong coalition. The NAVSUP ERP Team noted that the change management champions were assigned to the NAVSUP Vice Commander and the Executive Director of GLS (NAVSUP ERP Team, personal communication, 26 August 2013). NAVSUP also formed project teams and subordinate command teams to provide linkage to the Navy ERP Program Office to enable channels of communication, which allowed NAVSUP leadership the capability to monitor

progress and execute decision making operations as required throughout the implementation.

C.   TRAINING AND EDUCATION

As noted by Curko, Stepanic, and Varga (2012), training and education are instrumental in creating understanding for users, which will further help to identify the changes that the new system will bring to their currently understood work processes. Curko et al. (2012) further point out that most companies fail to properly estimate the amount of training needed. Hershey's ERP implementation is a prime example of improper training in that they attempted to implement multiple systems and overloaded users with training sessions that became to intricate and overwhelming (Perepu, 2008). After failing in their first attempt, lessons learned allowed Hershey's to eventually implement an ERP successfully in which the development of a training plan was noted as contributing to the success (Perepu, 2008). Nestle SA (Switzerland) and Nestle USA also learned the value of training during their ERP implementation, which recommended a large focus on training, inclusion of end-users in testing new system processes, and to provide training early and throughout the project (Dieringer, 2004). Air Products and Chemical, Inc. successfully implemented an ERP by putting significant levels of effort into planning and executing training through the use of power users within implementation time to be used as training resources for other business groups (Bhagwani, 2009).

The NAVSUP training strategy appears to be highly robust and focused on ensuring users understand the forecasted changes and how to properly use ERP software to perform their role. The first tool NAVSUP used to properly begin training users was through the use of role mapping. Role mapping set the foundation from which training materials, desk guides and reference guides were developed. This process identified the new role for users and additionally focused the training needed to perform the task.

NAVSUP also used workshops and *train the trainer* sessions to ensure those users involved understood the roles and how to perform the tasks necessary to complete ERP processes. Train the trainer can be a form of empowerment, which is noted by

Kotter (1995) as an important step in managing change. NAVSUP users that are properly trained and educated now possess the capability to correct issues or eliminate obstacles before they become a leadership issue. NAVSUP took training a step further in using available technology (Internet) to provide personnel with web-based training via their NAVSUP ERP website. Training is now available to anyone with an internet connection and may lead to users who are resistant to group training may find personal training more to their liking.

D.   COMMUNICATION

Communicating is noted by Merrell (2012) as a means to generate understanding and align the organization from the top to bottom, while additionally, guiding and motivating employees. Merrell's (2012) bottom line is a need to communicate the rationale for change in order for personnel to make sense of the change. Hayes (2010) notes that Lewin suggested the appropriate use of communications will bring about reduced resistance to change, which falls in line with his belief that it is better to reduce the restraining forces rather than increase the driving forces (i.e., Figure 2).

The data collected for NAVSUP is focused primarily on what communications strategy or tools were used rather than conducting surveys or questionnaires throughout the command in order to measure the amount and effectiveness of NAVSUP communication. NAVSUP displays a rather robust use of communications concerning the Navy ERP implementation through the use of numerous methods.

First, NAVSUP assigned leaders to be responsible for the development of a communications strategy and its integration with other areas of the NAVSUP ERP PM. As noted in the Marathon Oil ERP implementation the use of newsletters, websites, workshops, conferences, hands-on training covered both one-way and interactive communication. NAVSUPs communication strategy utilized physical and technical means to reach NAVSUP personnel and subordinate commands.

Second, it is critical to be able to maintain strong communications inward and outward, which works to prevent a lack of understanding and maintain proper channels for monitoring project progress (Bhagwani, 2009). Communications must use a common

language and terminology in order to generate effective collaboration amongst teams and personnel as identified in an ERP implementation at the Vienna Austria City Administration (Bhagwani, 2009). NAVSUP communications to subordinate commands flowed through the program team structures (i.e., Figures 7 and 8) through the adoption of a cascading effect where subordinate commands generally mirrored higher echelon strategy and used the same tools to communicate what the Navy ERP meant to NAVSUP, the advantages of Navy ERP and how to properly prepare for its implementation.

E.   PROJECT MANAGEMENT

Successful project management requires the assignment of project responsibility to an individual or group of people, which will enable them to observe that project scope is clearly established, and controlled, while also evaluating changes against business needs, coordination across boundaries, development of milestones and clear delivery dates, enforcement of timelines, and escalation management of issues along with conflicts (Nah & Delgado, 2003, Curko et al., 2012). In addition to performing important tasks the personnel that makeup project management must be credible in technical and business knowledge in order to make appropriate decisions.

NAVSUP did in fact assign a team of personnel to lead the Navy ERP implementation, which consisted of skilled personnel capable in each of their areas of responsibilities. In a PowerPoint from the NAVSUP ERP Team (2008), there are clearly identified goals and milestones with numerous illustrations, and NAVSUP newsletters combined with the NAVSUP website reveal that other communication tools were used in an effort to communicate this. In addition the NAVSUP ERP Team used HEAT tickets to enable the capture and management of issues as they arose during the ERP implementation.

Weeks (May 13, 2008 through August 26, 2008)																
Activities	MAY 13	MAY 20	MAY 27	JUN 3	JUN 10	JUN 17	JUN 24	JUL 1	JUL 8	JUL 15	JUL 22	JUL 29	AUG 5	AUG 12	AUG 19	AUG 26
Executive VTC's	Time & Labor ◆	◆ Project Systems	Training ◆	◆ User Roles	◆ Comm. Toolkit		Budget ◆	Contracting & ERP ◆	IA & System Access ◆	Purchase Cards ◆	◆	Business Office ◆	IDP Training Plans ◆	Updates ◆	◆	◆ →
Executive Change Leader Workshops									◆		◆					
Follow on mid-level management VTC's				Time & Labor ◆	Project Systems ◆	User Roles ◆	Training ◆	◆	Comm. Toolkit ◆	Budget ◆ Contracting & ERP	IA & System Access ◆	Purchase Cards ◆	IDP Training Plans ◆ Business Office	◆	Updates ◆	◆ →

- Recommended VTC Attendees: CO's, ED's, GDO's
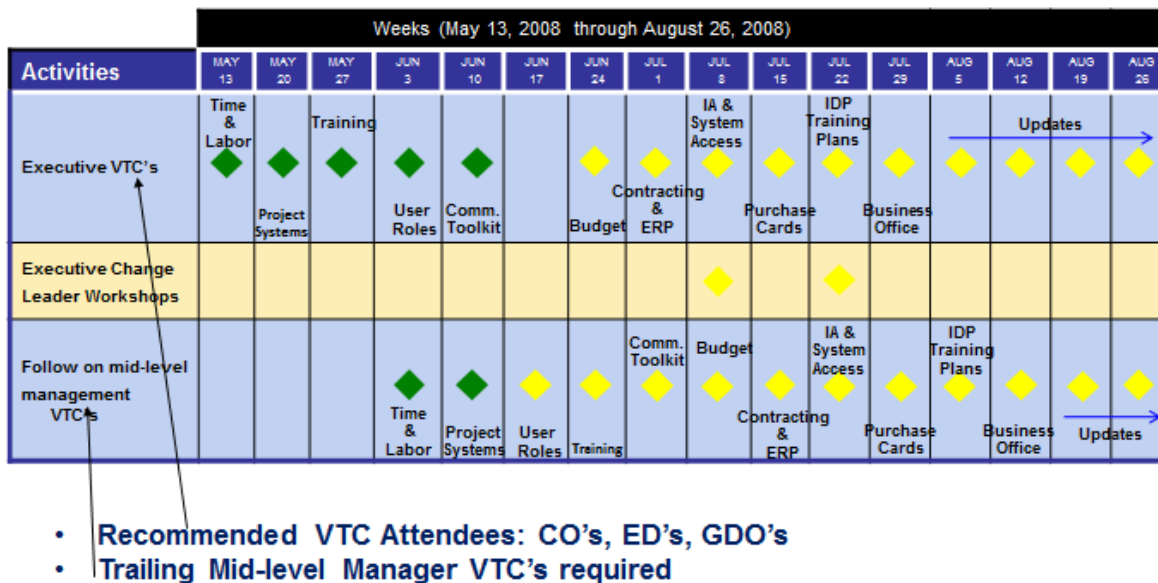- Trailing Mid-level Manager VTC's required

Figure 13.   NAVSUP ERP Campaign Plan (From NAVSUP ERP Team, 2008b)

NAVSUP also developed a weekly schedule including enterprise and activity level production, advisory board, and project tracking meetings, along with drumbeat sessions (NAVSUP ERP Team, 2008). The meetings at the enterprise level were both externally and internally oriented with direction for the activity level to develop their own personal coordination sessions and management reporting cycles (NAVSUP ERP Team, 2008). This rhythm appears to have helped manage the work load and maintain the necessary control required within project management.

F.   USER INVOLVEMENT

Organizations that involve users in the design and implementation, will either use or be affected in some way by the implementation of the new system, experience less resistance to change and generally are more effective at change management (Merrell, 2012). Merrell (2012) also noted that companies with effective change management were better capable of developing a sense of co-ownership toward the organizational change. In an ERP implementation at Nestle USA starting in 2000, one of the lessons learned was the involvement of users, who actually did the work, in the redesign of work processes prior to ERP implementation (Dieringer, 2004).

NAVSUP conducted user involvement within the BIA process through functional workshops early on in the implementation with NAVSUP Activity SMEs who provided overviews of the system functionality within specified process areas (NAVSUP ERP Team, 2008a). This is very critical as noted in the Nestle case to ensure that redesigned processes are accurately configured and user input helps to ensure processes are properly designed to meet the requirements of the new roles. User involvement was further experienced with the role-mapping process and the inclusion of user feedback through role mapping events including change requests submission for the refinement of new processes prior to go-live. Feedback from NAVSUP personnel was also a capability on the NAVSUP ERP website through the use of a helpdesk that performed issue resolution and provided direct access to support on Navy ERP subject matter.

G.   SUSTAINMENT

Both Lewin (Hayes, 2010) and Kotter (1995) emphasized change sustainment within the change process and encouraged organizations implementing change to institutionalize the new approaches, maintain the new state by refreezing behavior and work to continue necessary changes if possible. In Figure 14, Hayes (2010) provides a visualization of Lewin's forces at play in an attempt to drive change, which increases the tension against the change and in turn when the driving forces subside, compliance may be shifted back to the former situation by the generated tension if it is not accounted for and reduced through sustainment planning.
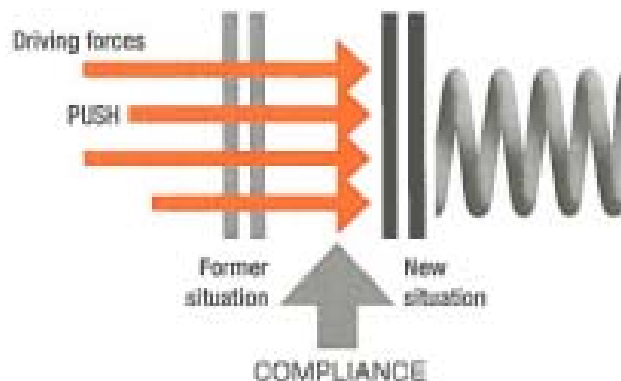

Figure 14.   Push Approach to Securing Change (From Hayes, 2010)

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The data collected for sustainment is limited, but what was collected demonstrates NAVSUP's identification of a needed plan to handle the sustainment of release 1.0 and enable the ability for their focus to be shifted to release 1.1. NAVSUP used HEAT tickets to provide Navy ERP end-users technical and issue resolution support (i.e., Figure 12). In addition to the HEAT tickets, NAVSUP developed sustainment training to include training and knowledge transfer events to ensure end-users operating Navy ERP roles remained focused on solidifying new processes and internalizing the changes brought on by release 1.0. The NAVSUP ERP Team stated that as soon as release 1.0 was complete their focus quickly shifted to release 1.1 (NAVSUP ERP Team, personal communication, 4 June 2013).

H.   SUMMARY

In addition to the factors employed by NAVSUP during the Navy ERP implementation there are additional areas that contributed to the overall success of Navy ERP release 1.0. One of the factors that stands out is the incremental approach adopted by the Navy ERP Program Office, which decreased the amount of complexity involved in each implementation. Navy ERP was broken down into versions or templates (release 1.0 and release 1.1) based on functionality, which helped commands maintain commonality with other command implementations.

Another factor was the amount of customization employed by NAVSUP in redesigning business processes for release 1.0. The NAVSUP ERP Team stated that NAVSUP did not look to radically change their processes with Navy ERP, but understood that ERPs will inherently require at a minimum some business process reengineering, which were vetted and decided upon as they were encountered (NAVSUP ERP Team, personal communication, 16 July 2013). In the ERP implementation at Nestle and Air Products and Chemicals, Inc. it was a noted issue that Nestle tried to customize the ERP implementation too much, which can increase the project cost, timeline, and likelihood of system bugs (Dieringer, 2004, Bhagwani, 2009). It is highly recommended to avoid extensive customization, which NAVSUP accomplished.

The next factor considers the circumstances leading up to the Navy ERP implementation at NAVSUP and how NAVSUP was already engaged in a period of transition and change. NAVSUP began the implementation of the pilot program SMART in 1999 and went live on 3 January 2003. Eventually, SMART was retired, but by the time this occurred the Navy ERP concept was already in development and implementation planning was already in process. NAVSUP was not in a frozen or static position to allow the Navy ERP implementation to exert a large amount of change resistance, which can be attributed to the continual change environment in IT systems throughout the past decade and the focus on RBA in the Navy as a continual emphasized objective of high-level Navy strategy documents. According to Kotter's (1995) eight step process to change, one of those steps involves the ability of generating small wins in order to maintain the momentum of a large implementation such as an ERP. It is apparent that NAVSUP had numerous successful small wins leading up to the Navy ERP release 1.0, which helped increased the organization's technical skills, acceptance for change and ability to implement a project of this size.

In consideration of the data collected on NAVSUP ERP implementation release 1.0 it is apparent from this comparative analysis that NAVSUP developed a robust change management strategy and applied change management factors that are consistent with private industry ERP implementations and research. NAVSUP maintained strong top management support, robust communications internally and externally, involved end-users in the process planned and developed a training plan for all phases of the implementation, conducted impact analysis prior to implementation and in the end successful implemented release 1.0.

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V. CONCLUSION AND RECOMMENDATIONS

A. CONCLUSION

Throughout both private and public industries, ERPs are fast becoming the way ahead to an integrated enterprise network, where business processes are streamlined in an effort to increase benefits, gain efficiencies, reduce costs and generate greater productivity. From the limited research conducted in this thesis it is also evident that ERP implementations are not all the same and the characteristics such as; culture, infrastructure makeup, and business organization within each organization are significant factors that must be considered during planning to enable the development of a comprehensive strategy.

Change management is a critical aspect of any major ERP implementation due to the large presence of humans within an organization's numerous business processes. Human beings are emotional with a wide variety of behaviors that can create a difficult dilemma for business leadership in the attempt to properly and effectively influence them to follow a new strategy or vision that they have projected for the future. If organizations want to master the ability to change and therefore possess a capability required in the new business environment (rapid change), they must begin to understand change management and incorporate it fully into their ERP implementation strategy.

From the research in this thesis it is clear that DoD is aware of the benefits of incorporating change management into their ERP implementations. Throughout the NAVSUP ERP implementation, change management was addressed and afforded the proper level of effort. NAVSUP formed a change management team, conducted analysis on change impacts to the organization, developed mitigation steps combined with training and then incorporated this into the overall implementation strategy. The personnel within NAVSUP were given value and importance, which enabled NAVSUP to implement an ERP with minimal disruption to the existing organization. However, every ERP will not be the same nor the personnel that makeup the organization, which will require a more

flexible approach that enables the DoD to quickly and effectively incorporate the most appropriate factors based upon the situation.

After conducting research on successful change management factors in the private industry it is clear that a few notable ones stand out from their frequency of occurrences. Even though these factors stand out it does not mean that others can be ignored nor does it imply that additional aspects will be the same in every ERP implementation. DoD will be better served in developing a strategy for future ERP implementations that first and foremost does not restrict leadership, but provides the necessary tools and resources to adapt implementation strategies to fit the analysis of their organizations.

B.   RESEARCH QUESTIONS

1.   Is there a Significant Difference between the Change Management Factors Applied to Successful Commercial Sector ERP Implementation and Dod ERP Implementation?

The strategy within the Navy, prior to the implementation of the Navy pilot programs and further carried on into the Navy ERP, was to modernize business processes. A critical component of this strategy was the motivation and desire to gain insights from private industry and in turn use those insights to successfully modernize the Navy. The NAVSUP implementation is a direct reflection, if not a small one, on how the private sector success factors are being adopted in the DoD to influence DoD ERP implementations toward a successful outcome.

From the analysis conducted in Chapter IV there is clear evidence that the Navy ERP implementation at NAVSUP used the same change management success factors observed in both private industry ERP implementations and research. Due to the limited amount of data collected, further factors were not capable of being determined in order to discover a more clearly defined distinction between private and public industry change management approaches. Additionally, this research did not seek out the effectiveness of the change management strategy by NAVSUP, through the use of metrics, surveys and questionnaires.

2.	**What Change Management Factors Emerge from Successful Private/Commercial Sector ERP Implementations Compared with DoD ERP Implementations?**

Literature reviews and private industry research revealed numerous change management critical success factors, which were narrowed down to the most reoccurring as follows:

- Top management sponsorship
- User management / training
- Communication
- Project Management
- User Involvement
- Sustainment

Private industry research offered numerous additional aspects within change management, but they were not determined to be instrumental in all ERP implementations. It is further necessary to note that this research was solely conducted at the echelon II level within NAVSUP and provided a narrowly focused view of the full ERP implementation, which occurred across multiple geographical locations with numerous sites at the activity level and lower.

3.	**What Change Management Model/Framework Does the DoD Utilize in ERP Implementation?**

It was revealed that the DoD approach for the Navy ERP is very much in line with private industry by using an approach that focuses first on identifying the need for change, generating support for the change, identifying impact to the business processes, and then using analysis to conduct proper planning of a change management strategy (training, communication and business processes) at higher levels, which is then cascaded down to lower level implementation sites and integrated into their strategy development (i.e., Figure 9).

A revealing strength of this approach is the alignment of the objectives down to the smallest level implementation site and the clearly defined channels of communication. This approach provides leadership the ability to exercise

communications with limited disruption, set the example and guide subordinates teams in the execution of the overall strategy.

4. What Change Management Model or Approach Best Suits the DoD?

The data collected did not support a conclusion regarding what approach best suits the DoD, which means for future research to occur metrics, must be used by the change management team for the appropriate measurement of change management strategy effectiveness to enable an accurate diagnosis of what succeeded or failed to influence personnel in successfully accepting change.

C. RECOMMENDATIONS

As the DoD continues to advance its enterprise strategy in the area of IT, it is clear that ERPs will continue to be a part of that strategy to bring about the future integration of business processes across the services and government agencies. The limited scope of this research does not provide an encompassing picture of change management practices and approaches across the public sector, but it does provide an example of a single successful implementation regarding change management and can serve as the necessary starting template for future ERP implementations as the DoD continues to modernize business processes. The collection of multiple lessons learned during numerous implementations will further the ability of the DoD to be better prepared and allow the development of a template capable of flexing to the requirements of a particular implementation. Unfortunately, change management is a single aspect of ERP implementations amongst numerous other factors, so future research insights may yield additional understandings, which can be incorporated into the development of a more adaptable and successful approach.

As the DoD progresses with future ERPs they will inherently discover that other commands possess unique characteristics, which may preclude an acceptable outcome from using the same approach each and every time. There must be additional adequate research and robust documentation of ERP implementations in both the technical and lessons learned areas, so a single source of knowledge can exist from which future planners, senior leadership and project leads may tap into in order to generate the most

appropriate strategy for each and every ERP critical aspect. During interviews with NAVSUP on the Navy ERP implementation in 2008, it became difficult for team members to adequately remember what had occurred and provide a rich and detailed description of change management procedures necessary for research. It is highly recommended that documentation occurs and is integrated with existing material for use by those individuals implementing future ERPs.

D.   FUTURE RESEARCH

Based on the successfulness of the NAVSUP change management approach, it is recommended that DoD works to conduct further research on successful implementations in not only change management, but other factors besides ROI and technical aspects in order to develop a clearly defined ERP implementation approach with all the necessary factors to enable better integrated and transparent business operations.

In addition to research on other ERP aspects, there is a tremendous amount of room for further research on change management in the Navy and other DoD ERP implementations at both the command and activity levels. This research is best served if it identifies the effectiveness of change management strategies carried out by an organization's leadership. With the ability to determine effectiveness the DoD is capable of integrating useful factors within current and emerging implementation strategies and also eliminate ineffective aspects.

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